

33rd
YEAR

CHEMICAL WEEKLY

VOL. XXXIII

MAY 10, 1988

NO. 35

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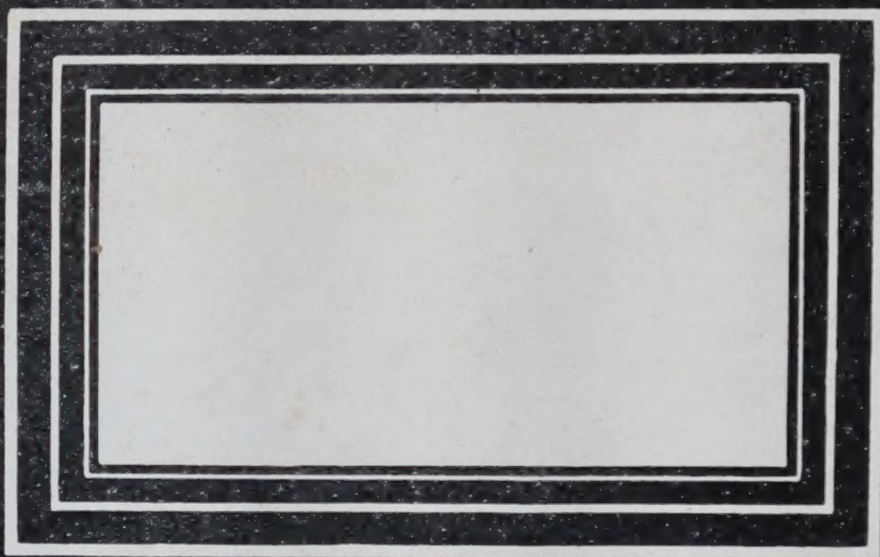
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Methanol -- RCF

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Rs. 24.50
per Kg. N.F.N.T.

Melamine

N-Butanol

Isobutanol

Isopropanol (IPA)

Phenol

Methylene Chloride

Aniline Oil

Nitro Benzene

Cellosolve (Belgium)

Propylene Glycol

Thionyl Chloride (Imported)

Octanol (2-Ethyl Hexanol)

D.O.P.

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Ethylene Vinyl Acetate (EVA)

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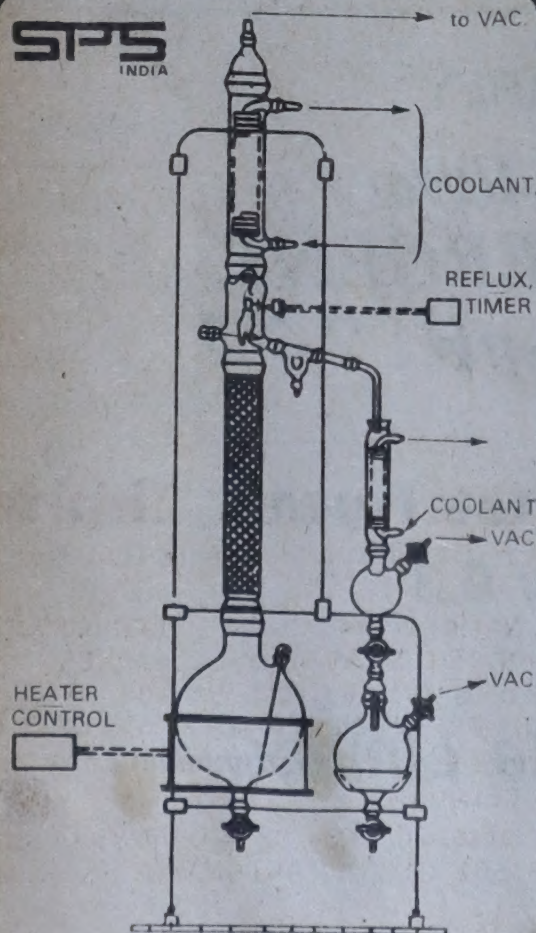
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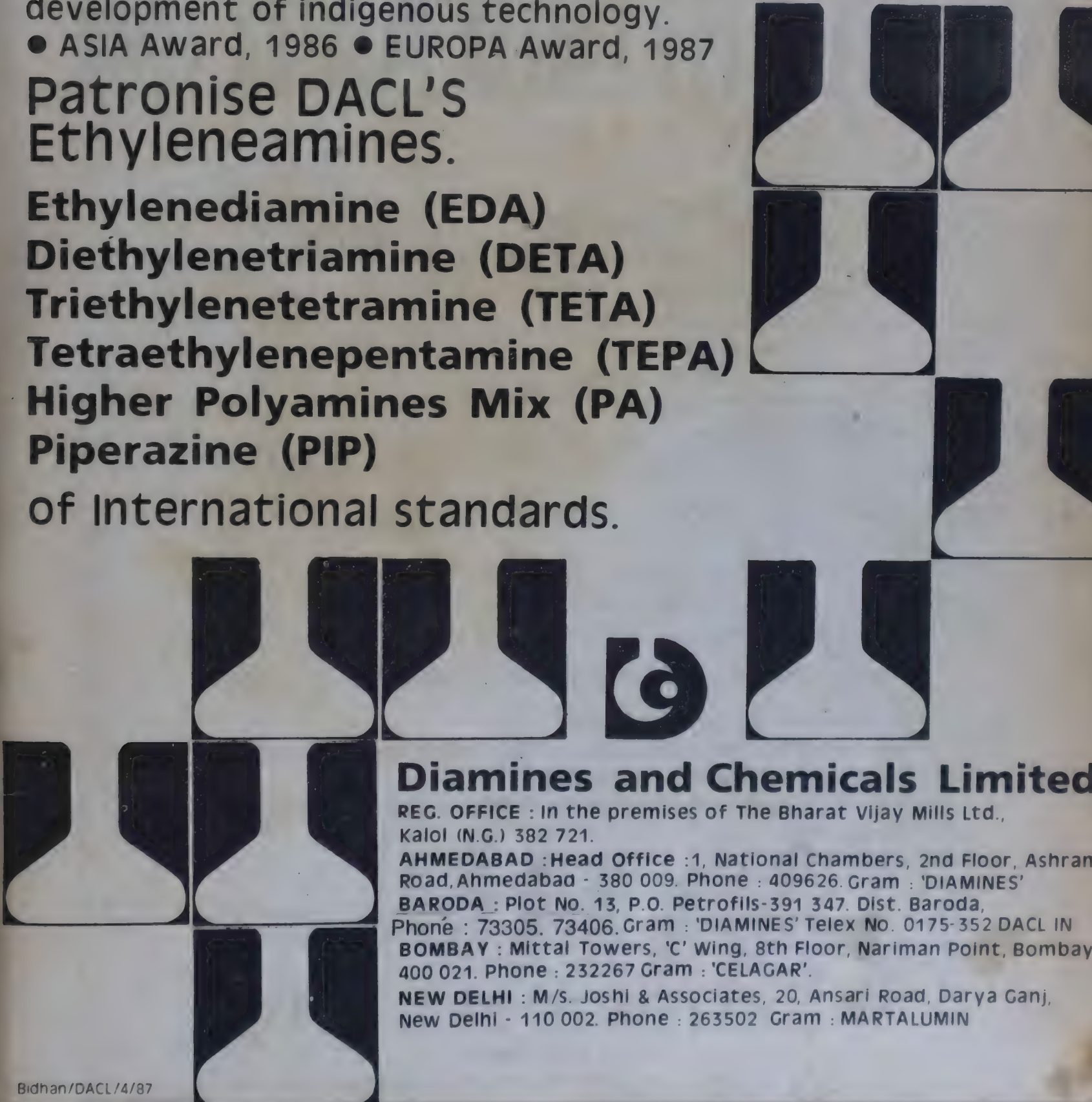
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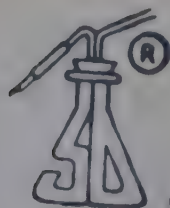
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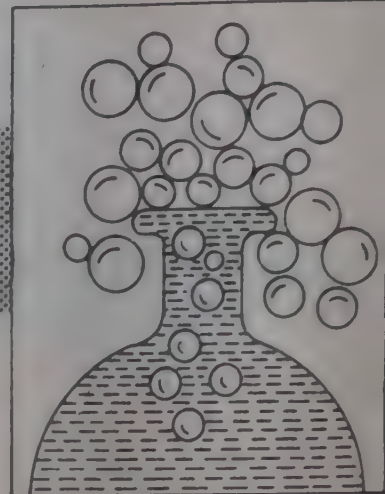
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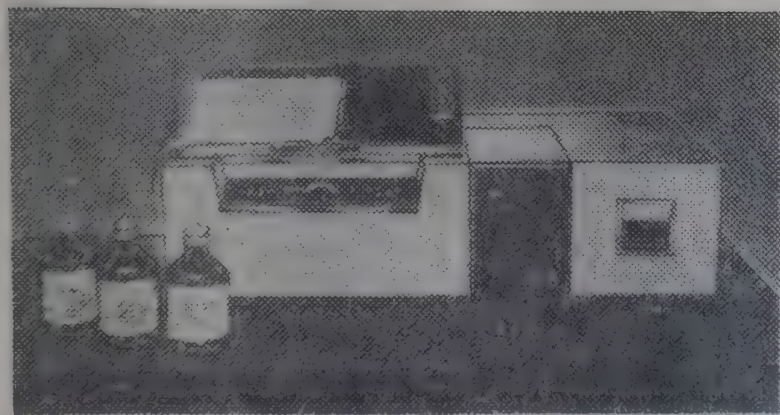
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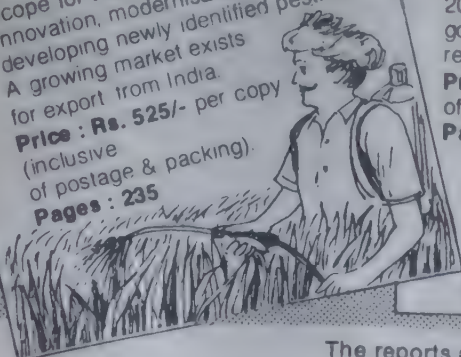
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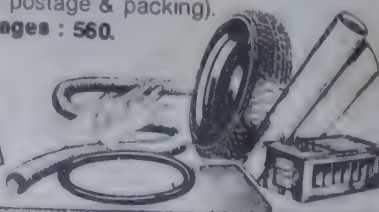
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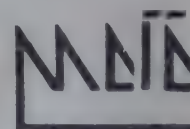


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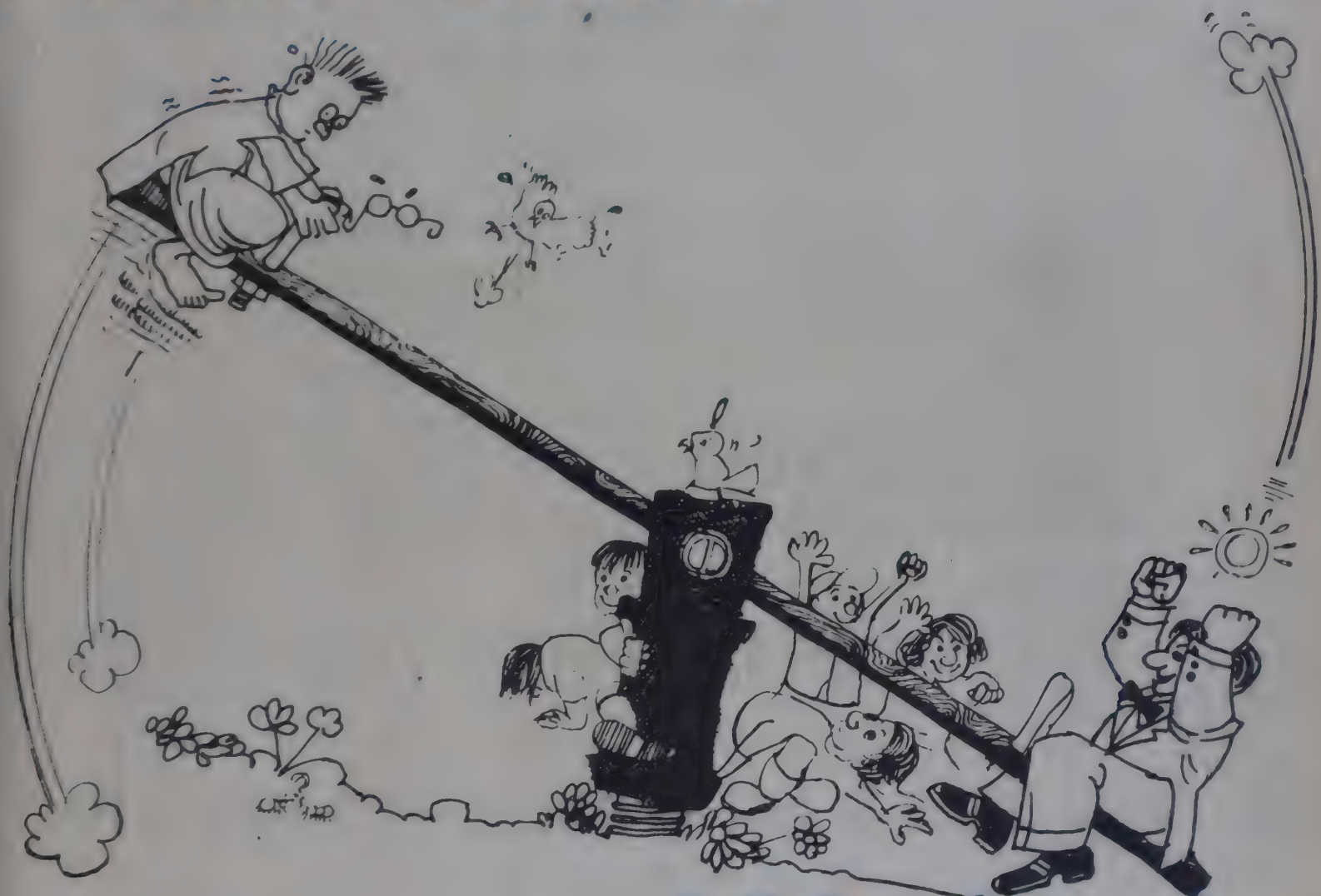
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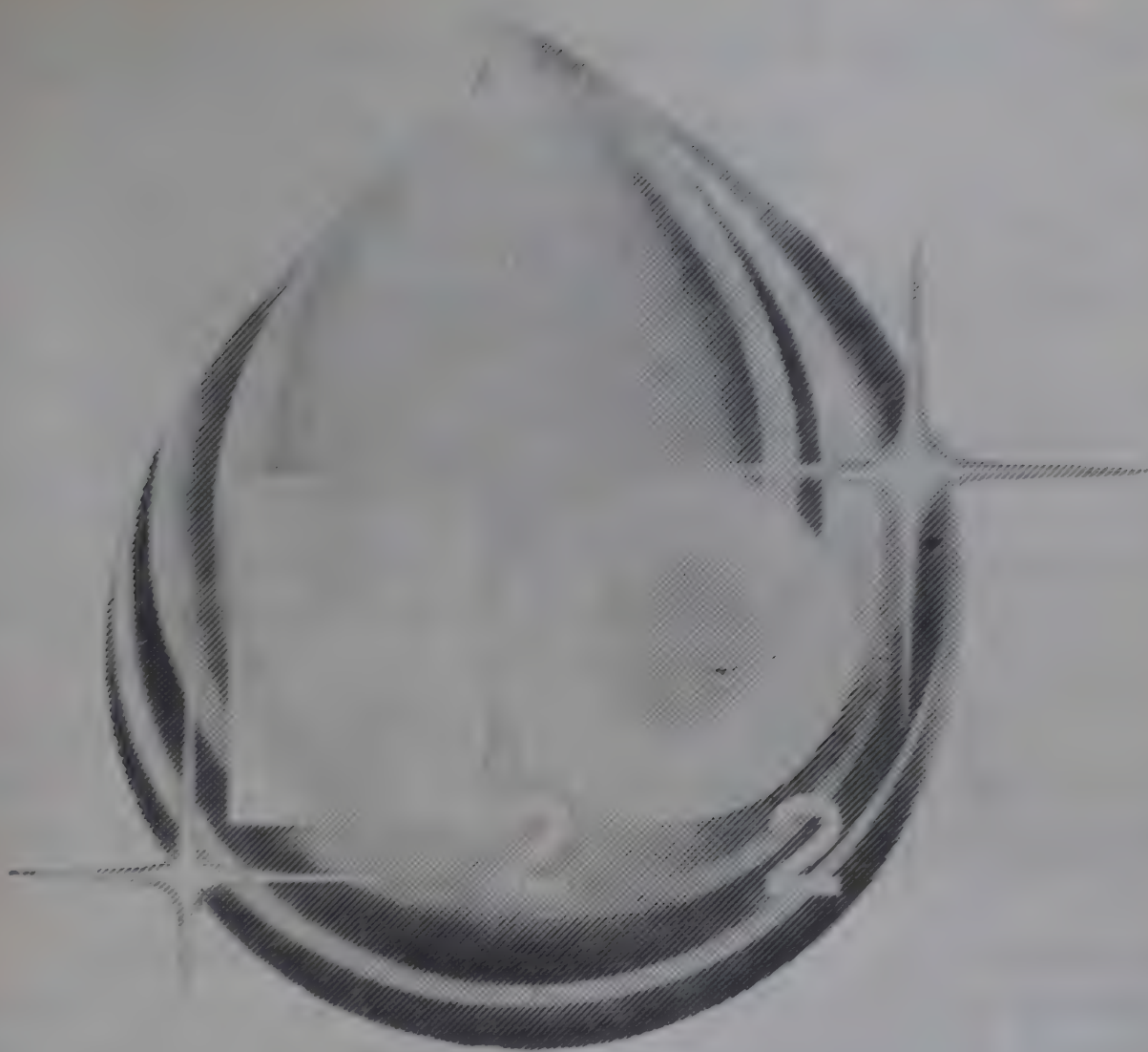
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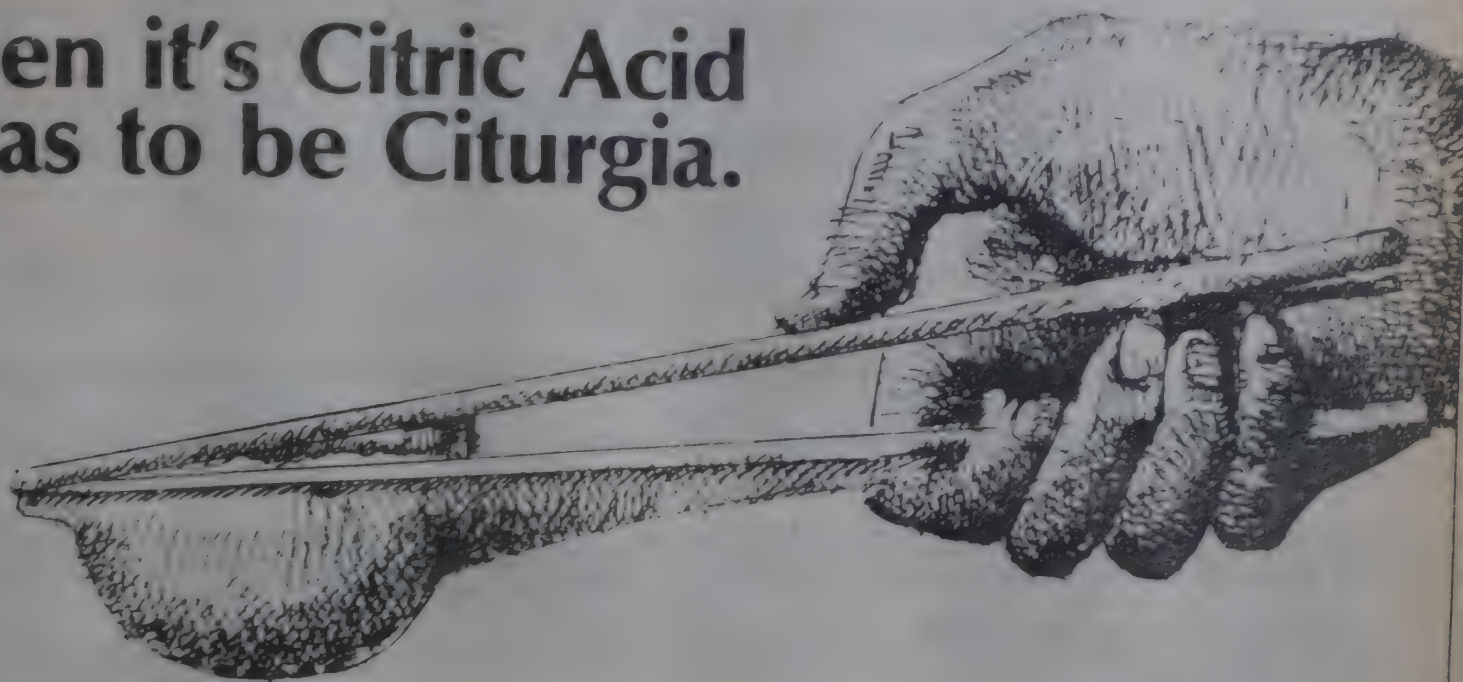
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Pioneers and Visionaries of Space Research

The II World War (1939-45) played an important role in the development of rocket technology. But even before the war, there were quite a few who, called themselves as the "rocket group" or members of interplanetary society who experimented with solid and liquid fuel rocket motors and some even launched a few rockets. These self styled rocketters looked to three scientists for their inspiration. These three great pioneers worked independently to develop rocket theory and conceived step by step multi stage rockets. The first was a Russian, the second an American and the third still living was born in Rumania but became a German citizen.

The historically minded Indian may feel flattered to learn that the Indian troops (Multineers as they were then called) used war rockets or "arrows of flying fire" against the British more than a century ago.

Konstantin Eduardovics Tsiolkovsky (1857-1935) was born in KALUGA in the U.S.S.R. A mathematics teacher, he formulated basic calculations for rocket thrust and staged rocket vehicles. He recognised the greater value and utility of liquid propellants (including liquid hydrogen and oxygen) and considered the problems of high acceleration on launching to Earth Satellite Velocity and the Zero gravity condition of free fall. All these facts were enumerated in his book "A rocket into cosmic space" published in 1903.

This great visionary in his original paper pointed out that at a particular altitude, high up in space, an object placed above the Equator would be travelling at the same angular Velocity as the Earth.

This observation was made in a paper by Tsiolkovsky published in 1891. He was examining the gravitational loads and high gravitation forces on Jupiter, weightlessness in free fall etc. He visualised a "high power" (off such a height which would be impossible to construct) gravity gradually lessened because of the Earth's rotational velocity, creating centripetal forces. He wrote that at a distance of 34,000 Kersts (a Russian measure of distance) equivalent to 35,800 Kms, gravity would be annihilated. He went on to conclude that an object released at this (geostationary) altitude, would be weightless and orbit around the Earth.

This eminent Russian mathematician wrote several small books devoted to the problems of organisation for interplanetary travel and its prospects. He envisaged that after the establishment of the first artificial Earth Satellite, a logical programme would follow flight to planets, interplanetary stations and cities, and great communities in space adapted to the needs of expanding humanity.

In the U.S., Robert Hutchings Goddard (1882-1945) developed rocket theory and experimented with Steel rockets, with carefully narrowed nozzles to achieve supersonic exhaust flow. The Smithsonian Institution sponsored his research from 1917-1929. Goddard, not only derived formula for staged rocket flight but proved to be an inventor of extra ordinary imagination. In his lifetime he was issued 48 patents. Eventually 166 additional patents were issued bringing the total to 214. In 1958, the U.S. Government settled \$1 million for rights of use of these patents by the U.S. Department of Defence and National Aeronautics and Space Administration (NASA).

His publication "A method for reaching high altitudes" (1919) set forth the theory of launching rockets. Experimenting initially with solid fuels, he shifted to liquid oxygen and gasoline in 1920. His papers clearly bring out his dreams of flight to the moon and interplanetary exploration.

On March 16, 1926, Goddard launched the World's first liquid propellant rocket which rose to a height of 41 feet and covered a distance of 184 feet. Between 1926 & 1941 Goddard launched 31 more rockets and his design provided gyro-stabilisation techniques, automatic sequencing launch systems, flight trajectory recording systems and parachute receiver. While all these techniques have been refined and perfected subsequently, we cannot forget that it was Goddard who thought of them first.

Our third pioneer is Herman Julius Oberth (1894) born in Sibiu which was then a part of Austro Hungarian Empire. He was thrilled and fascinated by Jules Verne's book "From the Earth to the Moon" although he realised that a cannon was not the way to put a man into space as Jules Verne planned. During World War I, he proposed to the German war office a long range missile that would

use liquid air and methanol. He envisaged the multi stage space rocket by suggesting that the ballistic range would be controlled by continuous measurement of acceleration which triggered "the closing of the propellant valves at the proper moment".

Oberth, obtained his doctorate at Heidelberg for his thesis "The Rocket into Interplanetary Space" (1923). In 1929, his classic "Means for space travel" was published.

These three men shared certain fundamental characteristics, independent thinking, great self confidence and enormous perseverance. All were ahead of their time. In each case, the acknowledgement of their efforts was modest and slow in coming from their peers at home while the general paucity of research publications in this discipline, in the twenties and thirties of this century and the language barrier, prevented the outside world from having access to their work.

Concept of rockets and space flights, were limited in the third and fourth decade to the imagination of the science fiction writers. The outbreak of World War II slowed or stopped such research in forward areas of technology particularly in Germany. Here a young engineer, Wernher Von Braun (1912-77) had to pigeonhole his dreams of space flight to become the technical leader of a burgeoning missile development programme.

By 1945, Germany had been defeated but the whole world was aware of rocket propulsion. The best known weapon was V2 rocket, which could carry a war head of 1000 Kg over 200 miles. Von Braun and about two hundred of his top technical team came to the U.S. and boosted the country's knowledge and understanding of this rapidly developing field. Within a year, they were assembling V2s at the Army's proving ground in New Mexico. By 1955, Von Braun and his team had become American citizens and were engaged in developing ballistic missile at Huntsville, Alabama.

In the Soviet Union, Sergiy Pavlovich Korolev (1906-66) had been leader of a Moscow group in 1931 and in next few years, he was reported to have successfully launched liquid propellant rockets. During the World War II, he designed rocket propulsion units as boosters for combat aircraft. Korolev is recognised as the guiding force and team leader of Soviet postwar programmes of sending rockets, ballistic missiles and as the developer of Soviet space launch vehicles.

Arthur C Clarke (1917) of England was an enthusiastic member of the British Interplanetary Society. An anachronistic British law, arising from Gey Faukes attempt to blow up the Parliament in 1606 stood in the way of active experimentation by this society.

In 1944, when V2 rockets were literally raining in London, Clarke realised that the Germans had indeed developed a large and reliable rocket engine — just the thing to make a satellite flight possible. In October 1945, in his paper entitled "Extraterrestrial Relays"

in the *Wireless World*, he pointed out that a spacecraft in Earth orbit, above the equator at an altitude of 35,800 Km would circle the Earth in one day. Electrical energy for the operation could be obtained from the sun by means of a heat engine driving an electric generator. In a prophetic statement he said that more direct use of the Sun's energy might become possible through development of solid state, solar cell.

It is not at all surprising that no one could visualise in 1945 the developments in electronics that would make unmanned communication possible. In September 1949, Eric Burgess, another charter member of the British Interplanetary Society also published a paper on the feasibility of an active geosynchronous communication satellite.

The role played by science fiction in spurring the imagination of the young scientists and researchers all over the world, cannot be overemphasised. Space research owes a lot to the imagination concepts outlined in science fiction magazines. Goddard had acknowledged the inspiration he drew from the work of Jules Verne (1828-1905) and the immortal classic of "The first man in the Moon" by HG Wells (1866-1946).

In Germany Kurd Lasswitz's book "On Two Planets" was read widely. Willy Ley, founder of the German Rocket Society emigrated to the U.S. where he published his book "Rockets, Missiles and Men in Space" which went through 20 printings and updatings since 1945.

The American Rocket Society formed a space flight committee in 1953. The International Geophysical Year (IGY) was to run from July 1957 to June 1958. It was a cooperative effort with 76 nations in global, geophysical, atmospheric and oceanic data gathering projects. President Eisenhower announced in July 1956, that the U.S. would launch an Earth Satellite as part of the U.S. programme for IGY. Unfortunately inter service rivalries in the U.S. Defence office and power politics did not let this project materialise. The American woke up to the realities of the situation only after the Russian stole a spectacular march over them.

On October 4, 1957, the U.S.S.R. launched the 85 Kg Sputnik I in Orbit. On November 3rd 1957, Sputnik II was launched carrying an instrumented dog, Laika. With Sputnik II it became clear that there was a strong Soviet interest in developing manned space flight. It was at this stage, that Von Braun received a go ahead signal to proceed with the U.S. Army satellite launch initiating the space race between the two giant states.

The history of the launch of the Space Vehicles and exploration tells only a part of the story. Parallel to the development of rocketry was that in electronics and radio communication. The history of the development of satellite communication is in truth the story of a handful of pioneers who had the vision to foresee a totally different world and worked steadfastly to make their vision a reality.

-- T.P.S. RA

CHEMARENA

S.L. VENKITESWARAN

Polymer Composites

The last decade witnessed two outstanding achievements which were possible entirely due to the special properties of advanced polymer composite materials. Bryan Allen pedalled across and over the English Channel with the "Gossamer Albatross". Dick Rutan and Jeana Yeager flew non-stop around the world in their "Voyager", specially designed airplane with no stoppage even for refuelling. These remarkable achievements were possible because of the outstanding strength to weight properties of the new reinforced plastic composites. Similarly, the US Air Force is well on way with an ATF -- Advanced Tactical Fighter -- whose structure will be composed of 50% or more of polymer composites as against less than 10% in today's fighter aircraft. Advanced composite polymers are the materials for tomorrow's technical revolutions. Many automobile firms are already on with the ever-widening use of these not only in the bodies but even under the hoods. The boats and other marine pleasure vessels were among the first to exploit the advantages of reinforced plastics from the early days of glass fibre for reinforcement. We are now further ahead with not merely reinforcement fibres of much higher strength to weight ratios but with polymer blends or alloys which are specially tailored for the desired properties. The composites can be designed for the toughest and most environmentally resistant products besides the weight advantage. Besides carbon fibres there are mineral or ceramic fibres as well. The polymer matrix besides holding the fillers or fibres together have special resistance to weathering and thermal and electrical properties.

The more mundane items of day to day use account for the bulk of the composite materials though the spectacular achievements of the Voyager airplane, hits the media headlines. Composites are about 5% of all plastics used in USA and was nearly 1200 million Kgs. in 1987. Automobiles have reached use at a level of 300 million Kgs. of polymers/composites -- over 50 pounds per car. Air crafts/aerospace materials are estimated to have used 40 million pounds of the highest priced composites. Construction industry is the second largest user with 2,00,000 tonnes followed by marine vehicles with 1,50,000 tonnes and electric/electronic materials 1,00,000 tonnes in USA. Value-wise the special com-

posites were \$850 million (34%) for Autos, \$425 million for other transports. These are for USA where the projected growth by AD 2000 is of the order of \$10 billion a year and the advanced composites set to grow at 20% a year as against a more modest 3% for run-of-the-mill conventional materials generally referred to also as engineering plastics.

A recent analysis of the trends in USA is given in *Chemical Business* of USA, July, 1987. The high performance engineering thermoplastics are based on two main generic types -- polyphenylene sulfide (PPS) and polysulfone (PSO) -- which account for 80% and a miscellaneous group of eight --

- PA - Polyarylate
- LCP - Liquid crystal polymers
- PES - Polyether sulfone
- PAS - Polyaryl sulfone
- PAI - Polyamide imide
- PEI - Polyether imide
- PEEK - Polyether ether ketone
- PEK - Polyether ketone

The production capacity of US producers and the trade names and prices of some of these are in Tables.

Table-1

Polymer	Consumption 1986*	1991*	Annual Growth
PPS	12.0	19.0	10%
PSO	6.0	8.0	6%
PEI	1.2	6.0	38%
PES/PAS	1.5	4.0	22%
PAI	0.4	0.6	9%
Polyarylate	0.3	5.0	75%
LCP	0.3	1.0	27%
Ketone polymers	0.3	0.9	25%
Other	0.1	0.2	15%
Total	22.1	44.7	15%

* Estimates: Figures in million pounds a year.
Source: Kossoff & Associates

TOP-PERFORMANCE RESIN HOSTER

Company	Location	Tradename	Capacity*	Unfilled	Price/lb Reinfo
POLYARYLATE					
Amoco	Marietta, OH	Ardel	13	\$ 2.64	\$
Celanese	Grand Island, NY	Durel	NA	\$ 2.80	--
	Corpus Christi, TX	Durel	<.5	--	--
Du Pont	Chattanooga, TN	Arylon	15	--	--
AROMATIC KETONE POLYMERS					
Amoco ¹	Marietta, OH	Kadel PAEK	>1	--	\$19
ICI ²	Wilmington, DE	Victrex PEEK	NA	\$23.50	\$19
		Victrex PEK	NA	\$32.00	--
POLYETHERIMIDE AND POLYAMIDE-IMIDE					
Amoco	Joliet, IL	Torlon PAI	NA	\$18.90	--
GE	Mt. Vernon, IN	Ultel PEI	NA	--	--
POLYPHENYLENE SULFIDE					
Phillips	Borger, TX	Ryton	16	--	\$ 1.
SULFONE POLYMERS					
Amoco	Marietta, OH	Udel PSO	12-13	\$ 3.82	\$ 3.
Amoco	Marietta, OH	Radel PAS	>1	\$ 4.25	--
ICI ³	Fayetteville, NC	Victrex PES	11	\$ 4.25	--
LIQUID CRYSTAL					
Dartco	Augusta GA	Xydar	20-22	--	\$ 7.
Celanese		Vectra	NA	--	\$ 7.

* Estimated capacity in million pounds a year. NA = Not Available.

(1) Amoco plant due second half 1987; (2) ICI PEEK/PEK plant due 1989; (3) ICI PES plant due 1988.

Source: Chemical Business.

Most producers have a proprietary polymer technology, a captive monomer production unit and a broad plastics business and above all versatile processing and testing facilities.

It is said that Liquid crystal polymers are the latest high growth area based on hydroxy naphthalene or hydroxy benzoic acids or bisphenol -- all with a basic aromatic polyester skeleton. LCPs are said to be new type of product with a strength to weight ratio seven times of steel wire. Their impact strength is very high even in very thin sectioned parts. Dartco's "Ultra 21" is used in dual "Ovenable" Cookware due to very high heat resistance. Polyarylate are likely to have maximum growth rates to

reach 100 million pounds by late Nineties according to Du Pont, the leader in this group. They claim to have a new polyarylate process which has cut production costs in a new 15 million lbs. a year facility.

Poly ketones are also new resins developed by Du Pont and others. Based on difluorobenzophenone they are claimed to be best for cables, fibres, automotive engine parts, electrical connectors and aerospace applications. Polymer chemists are expanding the frontiers of engineering thermoplastic capabilities to replace metals, ceramics and glasses for high performance end-uses. But development costs are sky high and only the few companies have the capacity to forge ahead.

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DRUG TESTING :

Five centres planned

The government has decided to set up five regional drug testing centres in the country.

Disclosing this at the 22nd annual general meeting of the Organisation of Pharmaceutical Producers of India (OPPI), Mr H. K. Khan secretary, department of chemicals, said that a national drug and pharmaceutical authority is being set up to finance these quality control centres at an estimated cost of Rs 25 crores.

To start with, the money accrued with the Drug Price Equalisation Account will be transferred to the new authority to fund the centres, he said.

In the light of the recent happenings, in this very city (Bombay) where innocent lives have been lost to the administration of spurious drugs, it must be the drug industry's endeavour to ensure that the medicines supplied are of standard quality, he said.

The government on its part has decided on setting up testing laboratories outside the industry till such time as the government laboratories and in-house labs are fully capable of undertaking elaborate tests, he said.

For the small scale drug units, the Industrial Development Bank of India will finance the setting up of testing centres in the cooperative sector, he added.

Stressing on the government drive to boost exports in every sector, he said the export scheme to give special facilities to pharmaceutical companies identified for exports is almost ready.

Under the export scheme, which is likely to be ready by the end of May, companies which have export potential will be given targets for exports and as long as they adhere to these targets, all facilities will be extended, he said.

As to the criticism that the new DPCO has not been fully implemented, Mr Khan said that various irritants like trade margins have been removed and there is no impediment in the implementation of the DPCO and the Government is committed to implement it fully. He called upon those in the industry who have not got their prices fixed under the new DPCO to do so immediately.

Mr. Khan said the Kelkar Committee on DPCO will continue to function till the middle of next month and submit its final report after hearing more representations from various companies to remove any anomaly in the new DPCO and the price control.

Since the members of OPPI are companies having foreign share-holdings, they have access to the latest technology and research carried out in the best equipped laboratories, which could help in the development of the Indian pharmaceutical industry, he said.

He advised the OPPI to come forward with proposals for phased manufacturing programmes since there is a keen desire among drug companies abroad to invest in manufacturing life-saving drugs and vaccines not made in India.

Mr. Khan said the pharmaceutical industry had made impressive strides in exports with total exports last year being around Rs. 300 crores. He hoped it would increase to Rs. 400 crores next year and touch the Rs. 500 crores mark by the end of the Seventh Plan.

In his presidential address, Mr. C. M. Hattangadi, the outgoing President of OPPI said that the pharmaceutical industry can meet the country's requirement of essential medicines of high quality at reasonable prices through the normal market mechanism for the comparatively better off people. It is only for poor who are unable to buy medicines that the Government and society at large should find a solution.

The pharmaceutical industry on its part is prepared to supply high quality medicines to government health programmes at substantially reduced prices, he said.

Regarding drug prices, Mr. Hattangadi said that it is the responsibility of the Government and the industry to ensure that price increases were legitimate and warranted by costs. While the industry will vigorously pursue it, the government on its part must en-

courage and provide incentives for such pursuit, programmes for cost reduction, technology upgradation, optimisation of production and productivity improvement which alone in the long run will lead to lower costs and prices, he said.

INDO-GERMAN PHARMACHEM

Indo-German Pharmachem Equipments, a Bombay-based company, manufacturing equipment of machinery for chemicals and drug industries, has chalked out an expansion plan, according to a press release of the company.

It is already manufacturing a wide-range of machinery used in the liquid, oral and sterile liquid products. The range includes machinery for filling, filter press, emulsifier, mixing stirrer, drying ovens, vial cap sealing machines, rotary bottle washers, fluid bed-drier, etc.

The company's clientele include Glaxo, Boots, Unichem, May & Baker, Parke Davis, Alembic, etc., adds the release.

The expansion plan, the note adds, is expected to cost Rs. 40 lakhs. The land has already been acquired at Andheri, a city suburb. The current turnover of Rs. 60 lakhs is expected to touch Rs. 30 lakhs in 1988 and further to Rs. 1.5 crores in 1990-91.

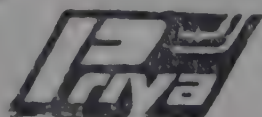
Besides the expansion, the company has also plans to diversify into the manufacturing of automobile machinery of the latest type.

BRIMCO

Brimco, a Bombay-based manufacturer of plastic machinery, is trying to market multi-layer plastic packaging, a popular packaging medium used by the food processing industry in the West.

Brimco has become the local selling agent of Western Polymer Inc. of United States for its five-layer extruder machines. It also plans to produce components and eventually set up a joint venture with the US partner. Multi-layer films up to three layers are already being produced in the country.

The chief merit of multi-layer packaging is its high tensile strength and "barrier" property which unlike conventional polyethylene packaging prevents entry of outside air into the pack.



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Dr. O. P. KHARBANDA

Frankly Speaking

DR. O. P. KHARBANDA

Cost & Management Consultant,

601, Olympus, Altamount Road, Bombay-400 026.

(An author of repute and a visiting professor, Dr. Kharbanda consults worldwide including to UNIDO)

Salt of the Earth

Thanks to a chance 'invitation', I had a most interesting Sunday, April 24 visiting 'natural' farms near Dahanu, some 120 kms north of Bombay along the sea-coast. Natural? No chemical fertilisers or pesticides are used, water usage is minimum ('drip irrigation') and yet the yield and taste of fruit and vegetables is claimed to be better than by the conventional 'synthetic' means. The visit was organised by the indomitable Kisan Mehta, best known now as the founder, architect and the 'doer' behind SAVE BOMBAY COMMITTEE. Amongst his and his dedicated group's achievements are: Stop the reclamation of the water 'patch' (All of it had already been 'sold' to the 'shark' builders) between Nariman Point and Cuffe Parade and thus prevent this part from joining the already existing 'concrete jungle'; Converting the 'scandal point' on Warden Road to a clean and well-maintained park and Kiddies corner BEFORE it got converted into a worse 'scandal' of skyscrapers and repeat of this exercise, now in hand on Napean Sea Road. Bombay-ites owe to Kisanbhai these invaluable 'lungs'.

But let me get back to the main subject. The visit to the farms was meant to be a prelude to formation of a new society to promote natural farming. Some 40 like-minded persons participated, some came as far away as from Poona, a highly talented and motivated group including 'friends of the trees' and exponents of natural living. Our visit covered farms of: Bothra, Bafna & Bhole — the last one owned and operated by a technocrat, Ravindra Bhole who has made it his mission and business to breed earthworms, the main focus of natural farming. These interesting wriggley creatures are hermaphroditic (having both male and female organs) and reproduce very fast. Earthworms are claimed to bring the pH of the soil to near neutral; improve soil structure; increase water absorption and retention; 'eat' farm waste and convert it into

mineral (NPK, Ca, Mg etc.) rich humus and thereby help plants to grow healthier, resist pests and diseases and improve yield and quality of the farm produce. I have used the word 'claim' because much of this is still an 'art' and 'science' has yet to catch up with it. The art is practiced world over, but still closely guarded and much of the work is of empirical nature and even reminiscent of folktales. The 'science' may well be provided by IIT, Powai, where a group headed by my colleague Prof. H.S. Shankar, encouraged by a DST grant, are proceeding with an exciting and comprehensive scientific programme of work.

The two farms, Bothra & Baphna were most impressive, indeed. No ploughing is used, dry fallen leaves are not removed and minimum amount of water is used. Earthworms do the 'ploughing' up and down the soil thus making the soil structure 'hollow'. The yield claimed is more than that through the use of chemical fertilisers and pesticides. The taste is better, too, that I confirmed first-hand. In true tradition of farmers, they provided us with sumptuous food, and would have nothing to do with 'Collection' earmarked for 'local expenses'. They are the salt of the earth'. So also the participants, I had the good fortune of meeting. Before the day ended, I and my family were invited by: A charming lady, industrialist-farmer, to visit her at Dahanu; an advocate-farmer to their country home for a swim knowing my yearn for a spot of clean, fresh, running water; an optometrist-farmer for a Khichri-Alphonso mango day at his Bulsar farm; and more.

What has all this got to do with the CHEMICAL WEEKLY? Don't forget that salt is a chemical; and let me add that it is very interesting word. Just explore its 'world' you will be full rewarded. I can assure you! Also CW's late Editor, K. S. S. Raghavan (GEM OF A MAN, CW 7.10.86) certainly qualifies for the 'salt of the earth' title.

MEG import duty cut to 90 percent

The import duty on Mono Ethylene Glycol (MEG) has been reduced from 55 per cent to 90 per cent.

According to a custom notification no. 152/88 issued by the government, the basic import duty on MEG has been brought down to 45 per cent from 110 per cent while the auxiliary duty remains unchanged at 45 per cent.

MEG is an important raw material that goes with DMT and PTA for the manufacture of polyester fibre, filament yarn and polyester films.

The present indigenous capacity of production of MEG by IPCL and NOCIL is approximately 1800 tonnes per month as compared with an estimated requirement of more than 7500 tonnes of MEG per month by the polyester and film manufacturers.

Thus, less than 25 per cent of the requirement is being met by indigenous production and balance requirements has to be met by import.

With a sharp increase in PFY demand and improvement in PSF consumption following the recent excise concessions, the production in polyester industry is expected to receive a big boost during the current year leading to a larger requirements of MEG.

The consuming industry's requirements of MEG for the current year is estimated at 1.15 lakh tonnes against the indigenous likely production of around 22,000 tonnes. Further, since no new capacity for MEG is in the pipeline in the current year, the dependence on import of MEG will increase considerably during 1988-89. The plant of India Glycols may commence production in the middle of next year.

In the meantime, the MEG prices in the international market has firmed up considerably at around \$850 per tonne CIF compared with around \$350 in September 1987, necessitating a revision in the customs duty to bring down the landed cost of the material at a reasonable level.

VCM DUTY CUT

The government issued a notification reducing the basic customs duty on Vinyl Chloride Monomer (VCM) imported for manufacture of PVC from the existing 10 per cent to five per cent ad valorem and on mono ethylene gly-

col (MEG) from 110 per cent to 45 per cent ad valorem.

By another notification, it exempted auxiliary duty on CM Imported for the same purpose.

The revenue loss for one year is expected to be Rs. 3.41 crores and Rs. 46.50 crores in the case of VCM and MEG respectively.

The minister of state for finance Mr. A. K. Panja placed the copies of both the notifications on the table of the Lok Sabha.

DMT DEARER

The Government has allowed domestic manufacturers of DMT to raise their prices, a source close to Bombay Dyeing has confirmed.

Bombay Dyeing's quotation remained unchanged at Rs. 21 per kg. till May 2nd. It is expected that the price would go up by Rs. 2.50 in the coming days. Apart from Bombay Dyeing, Indian Petrochemicals Corporation Ltd. (IPCL) and Bongaigaon Refinery in Assam manufacture DMT, which is consumed by the polyester staple fibre and filament yarn industry.

The price rise is a direct consequence of the steep rise in import duty on paraxylene effected by the Government by a notification following the Budget, from 85 per cent to 120 per cent. Bombay Dyeing is fully dependent on imported paraxylene while the other two producers depend on imports for part of their requirements.

According to industry sources, the price rise will affect PSF and PFY quotations and will cancel the effect of duty concessions on man-made fibres announced in the Budget.

PM TO INAUGURATE INDO-GULF FERTILISER PLANT

The Prime Minister, Mr. Rajiv Gandhi will inaugurate the Rs. 740-crore Indo-Gulf fertilizer plant near Jagdishpur, which is expected to be ready next month.

Spread over 800 acres of land the plant would produce 2,250 tonnes of urea and 1,350 tonnes of ammonia per day, Capt. Satish Sharma, MP, said.

It would provide direct employment to 1,000 people and indirect employment to a large number of people of the area. The H-B-J gas pipeline has already been laid for the plant by the Gas Authority of India Ltd.

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Government calls meeting

The government has called an urgent meeting in New Delhi to discuss DMT/PTA pricing pattern as also to review the supply and demand position of these vital raw materials for the polyester industry, it learnt.

The meeting summoned by the department of chemicals and petrochemicals will be attended by the representatives of DMT/PTA producers as also those of the polyester staple fibre, polyester filament yarn and polyester film manufacturers.

An important issue that is expected to come up for discussion at the meeting is the need to monitor supply position in such a way that the existing indigenous capacities are fully utilised before allowing any additional imports of DMT/PTA.

Some of the PSF and PFY manufacturers have already represented to the government that they are finding it difficult to get their DMT requirements in full from indigenous sources and they should be allowed to resort to imports. They have further represented that the import duty on DMT should be brought down from the present high level in view of the sharp increase in DMT prices in international markets.

They further stated that the domestic DMT producers do not have any inventory and all the three producers, namely, Bombay Dyeing, IPCL and Bongaigaon refineries are almost producing to their optimum capacity and still unable to supply the material as per their promises. Based on the promises by DMT manufacturers, the import entitlements of the consuming units were cut, while the indigenous supplies to certain units have been around 60 per cent of the promised quantity.

This situation has resulted in a very serious raw material supply problem, particularly for the units which are only DMT-based. Such units have suggested to the authorities to monitor DMT supplies in such a way that DMT should be supplied to dual-feed plants (having facility for consuming DMT and PTA) only after meeting full requirements of only DMT based plants, or else to allow DMT imports. Now that the PTA plant of Reliance is in a position to meet some of the requirements of dual-feed plants, such plants may be asked to go in for PTA

on the basis of indigenous availability, leaving adequate DMT supplies for DMT-based plants, they contended.

The raw material producers, on the other hand, maintain that there is adequate availability of DMT/PTA in the country to meet even the increased anticipated demand from the polyester industry following recent excise concessions.

According to them the indigenous raw material supply may exceed 2.50 lakh tonnes comprising 1.20 lakh tonnes of DMT and around 1.30 lakh tonnes of PTA. Thus, it can meet the entire demand of polyester industry, even if the PFY production increases to 1.40 lakh tonnes and PSF production to 1.10 lakh tonnes, making a total of 2.50 lakh tonnes. They, however, conceded that if supplies are properly regulated all units will receive adequate raw material supplies to meet their entire requirement, without resorting to any imports.

Meanwhile, the Bombay Dyeing, the largest DMT producer in the country, has stated that it has not raised the price and the company continues to sell its DMT at Rs. 21,000 per tonne, the same price as it has maintained for almost two and a half years.

S.M. DYECHEM PLANS 2 NEW PROJECTS

S.M. Dychem Limited, which has shown sustained good performance ever since it went public a couple of years ago, is set to record quantum jumps in sales and profits in the coming years.

The company's sales, which totalled Rs. 6.06 crores during the year ended August 31, 1987, are expected to increase to about Rs. 15 crores during the current year and further to Rs. 26 crores during 1988-89.

The company's new project for the manufacture of speciality surfactants at Pune was recently inaugurated by the Union finance minister, Mr. N. D. Tiwari. These styrene oxide-based speciality chemicals have great potential in man-made fibres, leather, paper, detergents, cosmetics and ceramics.

Meanwhile, the company is setting up a project for the manufacture of extruded snacks/pasta product. The

project, based on the Mapimpiant (Italy), technology is expected to be commissioned by the middle of 1988. The project is estimated to cost Rs. 5.80 crores and will be financed through an issue of convertible debentures to be offered to the existing shareholders on a rights basis. It is offering debentures (14 per cent) of Rs. 145 each which will be fully convertible. A sum of Rs. 45 per debenture will be converted into Rs. 10 each at a premium of Rs. 5 per share after six months from the date of allotment and the balance of Rs. 100 after three years from the date of allotment into whatever number of equity shares of Rs. 10 each at a premium that may be approved by the controller of capital issues at that time.

The company is also setting up a joint venture with Zschimmer & Schwarz, West Germany, to manufacture a complete range of chemicals, presently manufactured by the foreign collaborators. The project is estimated to cost Rs. 10 crores. Its equity will be Rs. 3 crores. The foreign collaborators S. M. Dychem will subscribe for 40 per cent shares. The balance of 20 per cent will be offered to the public.

R. K. GAJREE IS NEW BPCL CHIEF

Mr. R. K. Gajree has been appointed Bharat Petroleum's new Chairman & Managing Director with effect from May 2nd.

Mr. Gajree graduated in Mathematics from Punjab University in 1952. After a short stint with teaching, he proceeded to the United Kingdom and took up apprenticeship with a firm of Chartered Accountants in Scotland.

Prior to his appointment as Chairman & Managing Director, he was Bharat Petroleum's Director (Finance) for over 7 years. He has also held responsible positions of the Treasurer and the Chief Accountant.

NO FULL SUPPLY FROM BONGAIGAON

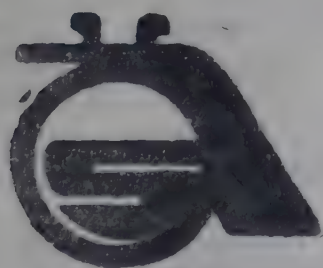
The Bongaigaon refinery, the DMT producer in the polyester industry that it will not be able to supply their monthly DMT quota in full during the current month.

The company has commissioned its PSF plant, requiring its DMT for captive consumption. Besides, it has gone for scheduled shutdown for three weeks beginning last week of April.

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NEWS DIGEST

TN chapter of R & D society inaugurated

The Tamil Nadu chapter of the "Society of R&D Managers of India" which was formed recently, will function as a voluntary link between R&D organisations and the Science and Technology policy planning institutions of the State Government.

The Director of the Forensic Science Laboratory, Prof. P. Chandra Sekharan, who has been elected the Society's chairman said that it aimed at creating awareness about R&D, adapting it to Indian conditions and disseminating it to other professionals.

The Society will be organising a seminar on 'Science and Technology Policy for Tamil Nadu' in Madras on July 8. About 100 delegates from Tamil Nadu and other parts of the country are expected to participate and the seminar will be used to prepare a document on Science and Technology policy to be submitted to the State and Central governments.

Other office-bearers of the Society are: Dr. P. Rodrigues of Indira Gandhi Centre for Atomic Research, Kalpakam, and Mr. S. Govindarajan of Carburettor Ltd. (vice-president), Mr. C. Damodaran of Forensic Science (R&D), Madras (secretary) and Mr. M. S. Swaminathan of Soumag Electronics (treasurer).

12 PC RISE IN PLASTICS USE FORESEEN

Dr. N. Dhuldhoya, managing director of Polyolefins Industries Ltd. (PIL) foresaw a 12 per cent annual growth in consumption of plastics materials in the country if the current rate of consumption is any indication.

Dr. Dhuldhoya was inaugurating a seminar on "plastic films" organised jointly by the Maharashtra Institute of Technology (MIT) and the Pune Chapter of Indian Plastic Institute (IPI) at Pune.

Dr Dhuldhoya remarked in this context that sectors like building and construction, automobiles, and agriculture and water management accounted for nearly 70 per cent of the plastic materials consumed and the reason for this high percentage of consumption was not its cheapness as mistakenly believed but because of durability.

He stressed the need for intensive interaction between educational institutions and industries, and hoped that educational institutions would take up basic research, product designing, product planning and product testing.

Mr S. V. Kabra, managing director, Kelsite Maschine Fabrik Co. Pvt. Ltd., said it was necessary to strive for achieving high standards of performance.

METHANOL PLANT COMMISSIONED

Assam Petrochemicals Ltd., Namrup, a pioneer in petrochemical industries based on natural gas has started trial runs of their 100 TPD Methanol Plant is expected to be in full operation by July 1988.

APL would meet the full requirements of Methanol for the DMT plant of Bongaigaon Refineries and Petrochemicals Ltd. Balance quantity of about 20,000 MTA would be sold to other customers mainly in the eastern region.

APL already manufactures methanol, formalin, U.F. resin and moulding powder. Formalin and U.F. resin "R-50" are mostly used by the plywood industries in N.E. Region. Some manufacturers are using the moulding powder under the trade name of "Petrolite-M" for manufacture of electrical items, crockeries, gift articles. Petrolite-M is manufactured as per Japanese standard in Japanese plants and is considered to be of very high quality.

MR. K. DHARAM, NOCIL'S MD MR. PATWARDHAN EXECUTIVE VICE-CHAIRMAN

Mr. K. Dharam, President, National Organic Chemical Industries Ltd. (NOCIL), has been appointed Managing Director from May 1, 1988.

A chemical engineer from the Lakshminarayana Institute of Technology, Nellore, he has had a long career with NOCIL. He joined the Company in August 1966 as Plant Assistant and soon became the Chief Technologist. In 1973, prior to his appointment as President in 1985, he was the Company's Works Manager. His earlier professional assignments have been with Gwalter Rayon, Century Rayon, Comcraft, an international consulting group based in Kenya.

He is an active member of the Bombay Chamber of Commerce & Industries and is presently the Alternative Chairman of the Environment Control Committee of the Chamber.

Mr. Dharam took over from Mr. S. Patwardhan, who has been appointed Executive Vice-Chairman of the Company effective May 1, 1988.

NEW OIL FINDS IN PAKISTAN

With the most recent discovery of oil and gas resources, Pakistan soon be half-way through to self-reliance in this vital sector.

Three new oilfields were discovered in this country last month with a potential of producing 7,000 barrels a day. All of them are located in Punjab province. The present production is the order of 48,000 barrels a day.

With addition from the new fields, the production is expected to meet 27 per cent of the total crude requirements of the country, according to the Minister for petroleum and natural resources, Mr. Nisar Ali. Pakistan has made some rapid strides in oil exploration and production in the past. According to official statistics, crude production has increased to 27 per cent during the last one year.

Pakistan's immediate problem is lack of adequate refining capacity. A refinery to exploit the latest discoveries is proposed to be set up in the public or private sector in the next few months. Till it is ready to be commissioned in about three years, the crude will be exported to other countries, it was stated.

Projects import duty may be curtailed

The government may curtail import duty on projects. The industry ministry is understood to have strongly lobbied for such a reduction.

According to a report appearing in the Economic Times, in a proposal submitted to the finance ministry, the industry ministry had said that reduction in import duty on projects had become inescapable because of sharp escalation of the rupee vis-a-vis other important currencies like the Yen, Deutschmark, Franc, Dollar and Pound sterling. At present, the project import duty is 85 per cent.

Apart from seeking reduction in import duties on projects, the ministry had suggested simultaneously steps should be taken to reduce duties on import raw of materials. In this respect, it had listed certain crucial raw materials like copper, nickel, and LDPE. The landed cost of these items had become prohibitive.

The ministry had also proposed that an inter-ministerial high power group be set up to assess availability of these raw materials and prepare a perspective plan to take effective measures to ensure that industry has easy access to these inputs. Currently, industry is

facing serious difficulties in procuring much needed raw materials, which are available only at extremely high prices. During the past year, it has been found that prices of steel, copper, lead, aluminium, nickel, LDPE, HDPE, rubber and industrial oils have risen steeply, thus rendering Indian products uncompetitive.

The ministry has sought a reduction in component import duties in order to ensure that the technology upgradation scheme, announced last year, is able to take off. The scheme which was announced for selected capital goods industries will not make much headway, it is felt, unless duties on imported components needed for modernisation are significantly reduced.

Enquiries reveal that the industry ministry has been forced to seek reduction in project import duty because over the past three years project costs have shot up by as much as 200 per cent in many cases. The steepest increase has evidently been witnessed in respect of project imports from Japan, West Germany and the UK.

According to the ministry what has made matters worse is that while the rupee has depreciated, the government

has been consistently raising duties on import of projects. Over the last three years, project import duty has been nearly doubled, from 45 per cent to 85 per cent along with an extra 5 per cent drought surcharge.

It is felt that unless steps are taken to reduce costs of projects set up with foreign collaboration, India will not be able to compete in international market. Official sources point out that to be able to meet domestic demand for various products as well as obligation the government will have to take a decision on these issues expeditiously.

In respect of a number of projects, the implementation has been found to be rather slow because of the vast difference between assured costs and actual costs. Implementing authorities also have to seek approvals for higher costs which is normally a time consuming process.

The revised policy guidelines have assumed greater significance in the context of the Prime Minister's recent statement that India needs more direct foreign investment.

The industry ministry is now engaged in an exercise to identify areas where the rate of foreign investment could be stepped up.

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Unitop chemicals plant inaugurated

The ultra modern speciality chemicals unit of M/s. Unitop Chemicals Pvt. Ltd., at Patalganga was formally inaugurated by Mr. Sadananda Shetty, Chairman and Managing Director of Vijaya Bank on 22nd April at a gala function held at Leela Penta Hotel, Bombay. 'Unitop' supported with full-fledged R & D facilities, is geared to produce 3000 tons of speciality chemicals with a turnover of Rs. 60 million.

Mr. B. D. Shetty, the young and enterprising Managing Director of Unitop welcomed the Chief Guest Mr. Sadananda Shetty and others. The chief guest later presented Momentos to the person who had helped Mr. B. D. Shetty in building up his group of companies.

Welcome Speech of B.D. Shetty :

In his welcome speech, Mr. Shetty traced the progress of his companies. He said after 15 years of hard work and dedication, the group has grown from a Rs. 60,000 venture to one worth well over Rs. 60 million. He added that Unitop had plans to expand its speciality product lines. Introducing the chief guest Mr. Sadananda

Shetty, he said that Mr. Shetty was a dynamic banker who had risen from a low cadre to the highest position of Chairman and Managing Director of Vijaya Bank. He was the youngest person to occupy the highest post in Vijaya Bank.

Mr. Sadananda Shetty's Speech :

Congratulating Unitop Chemicals and the man behind the company, Mr. B. D. Shetty, the C & M. D. of Vijaya Bank lauded the entrepreneurship of Mr. Shetty. He was happy to learn that Mr. Shetty had judiciously managed the Banking help to start a number of successful units.



Mr. Sadananda Shetty, C & M.D of Vijaya Bank inaugurating the UNITOP Chemicals plant. To his right are : Mr. G. Viswanathan (Marketing Manager, UNITOP), Mr. B. D. Shetty (Managing Director, UNITOP) and Mrs. S. D. Shetty (Director, UNITOP).

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UNITOP : A PROFILE

Unitop Chemicals Pvt. Ltd. is a Company belonging to the group viz: Techno Products (BOM) Pvt. Ltd., Ferri-Chem Industries, Barkur Surfactants Pvt. Ltd.

The units are engaged in manufacturing a wide spectrum of speciality chemicals and surfactants catering to the needs of textile and textile auxiliaries, pharmaceuticals, cosmetics, pesticides, man-made fibre industry etc. The group ventured a Technical Entrepreneur unit way back in 1973 in a small way manufacturing textile auxiliaries with a turnover of Rs. 60,000/- per year in the first year of production. Thereafter the activities expanded year after year with increased product mix and the turnover also jumped appreciably.

During the current year the group turnover is likely to touch Rs. 80 millions. Unitop Chemicals Pvt. Ltd., has further plans to expand its speciality product line with the help of R&D facilities at Patalganga MIDC area which is under implementation. Speciality chemicals for pesticide formulation, spin finishes, chemicals for oil exploration and process refining, metal treatment and speciality additives for lubricants, animal and poultry feed chemicals, rubber chemicals are some of the products which will be included in their manufacturing range. Associate companies of the group are :

M/s. FERRI-CHEM INDUSTRIES having its manufacturing facility at Gandhi Industrial Estate, Bombay-400 072 is engaged in speciality Chemicals for Pesticide formulation, Paper and Fertilizer Industry.

M/s. TECHNO PRODUCTS (BOM) PVT. LTD., Bombay-400 072 was commissioned in 1980 having manufacturing facility for Ethylene Oxide Condensates, Polyglycols, Emulsifiers and Wetting agents.

M/s. BARKUR SURFACTANTS PVT LTD. will have the manufacturing facility at T.T.C. Area of MIDC Thana for Anionics, Animal and Poultry feed chemicals.

Mr. Sadananda Shetty said that any successful industry presupposed three vital factors viz: capital, labour and entrepreneurship. He said: "It is very difficult for one to start an industry in a country where scarcity of capital and lack of inputs are prevalent. This is more pronounced in the small scale sector which is a prime sector in this country. The small scale industry is ideally suited to this country because it also develops the underdeveloped regions. It plays a vital role in the development of India because it largely feeds the larger scale sector."

Congratulating Mr. B. D. Shetty for his bold initiative in starting small scale units, the Vijaya Bank Chairman said "Mr. Shetty has lit the lamp of progress, he should guard the flame".

Quoting an American experts' opinion about the success of enterprise, Mr. Sadananda Shetty said that the success of American enterprise was due to

- (1) 9% experience
- (2) 21% intelligence
- (3) 6% personality

and the balance is entirely due to sheer hard work which was responsi-

ble for success. To be effective, the top management has to play few important roles. They are: Observance of rules of trade, tactfulness, firmness, fairplay and prudence. A manager should not only be a good negotiator but also develop skills of fellow workers. He should be an innovator. Success is measured not only in profits but also in producing quality which is a result of intelligent efforts," he said.

Talking about the Research & Development, Mr. Sadananda Shetty said that the R & D was very important for any organisation to keep pace with progress. Every industry needed the R & D efforts for its healthy growth. "It is not necessary for us to rely on other countries' R & D efforts. We have enough talents in this country", he opined.

"Many industries become sick not because of lack of capital, but due to diversion of capital from one area to another. The small scale industries should make use of Bill finance schemes for development", he said.

Mr. G. Viswanathan, marketing manager, of the 'Unitop' group of companies, proposed a vote of thanks.

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Tata Chemicals faces MRTPC probe

An apparently innocuous and innovative scheme of Tata Chemicals Limited seeking to promote import substitution and to save foreign exchange for the country is facing the prospects of being struck down as a "restrictive trade practice" prejudicial to public interest according to a report appearing in *The Economic Times*.

The Monopolies and Restrictive Trade Practices Commission has issued a notice of enquiry against Tata Chemicals on charges that its agreement with the Nirma group of companies for the sale of 1,60,000 tonnes of soda ash at an "import substitution discount" constitutes a restrictive trade practice within the meaning of section 2(0) and 33(1) of the MRTPA Act.

The commission has acted on the basis of an application filed by the director-general of investigation and registration in the company affairs department.

The director-general has taken objections to two clauses of the agreement entered into by Tata Chemicals

with the Nirma group of companies and has alleged that the agreement is in violation of the MRTPA Act.

The following are the two clauses:

— "In pursuit of the objectives of the aforesaid sales policy, we have decided to offer, for the year 1986-87, 'import substitution discount', to those of our customers who can, but will not, except in the event of felt need arising, import soda ash and with whom we have developed a long and amicable relationship based on high ethical standards of business. Happily, you (Nirma group of companies) rank amongst our most important customers to whom we are glad to offer 'import substitution discount' on terms and conditions set out hereinafter".

— "On the basis of your (Nirma group's) categorical assurance that you will use only indigenous (and not even necessarily Tata's) soda ash and will not import any soda ash, except in the event of our declared inability to supply you the committed quantity in the manner aforesaid, we shall offer you

the following incentives for 'import substitution'.

(i) An Import substitution discount of Rs. 50 per tonne on our basic ex-works bulk price (Please also refer to paragraph 6 below).

(ii) An extended credit of 30 days (compared to our normal credit of 21 days)".

The director-general has submitted that the terms and conditions referred to in the agreement are restrictive trade practices under clause (e) of section 33(1) of the MRTPA Act.

He has argued that the trade practice outlined in the impugned clauses are deemed to be restrictive trade practice as by its "inherent nature and inevitable effect", it necessarily impairs competition and thus it is no longer necessary under the act to show any other facts or circumstances.

"The act now does away with any further proof, etc., perhaps to avoid waste of judicial and administrative resources as because of their pernicious effect they are conclusively presumed to be unreasonable and illegal even without any elaborate inquiry as to the precise harm they have caused or the business excuse for their use."

The director-general has further argued that with effect from August 1, 1984, every agreement falling within one or more of the categories enumerated in section 33(1) of the act is deemed to be an agreement relating to restrictive trade practices for purpose of the act.

Also, the restrictive trade practices mentioned are deemed under the act to be prejudicial to the public interest.

Therefore, the director-general goes on to plead for a "cease and desist" order by the commission directing Tata Chemicals not to indulge in the restrictive trade practice and not to repeat the same in future.

The terms of the Tata Chemicals-Nirma tie-up has been listed in a letter dated May 26, 1986 written by Tata Chemicals to Nirma.

Tata Chemicals says in the letter that on the basis of the current indications, the indigenous production of soda ash could greatly substitute the import of the item, much to the benefit of the country's balance of payments position.

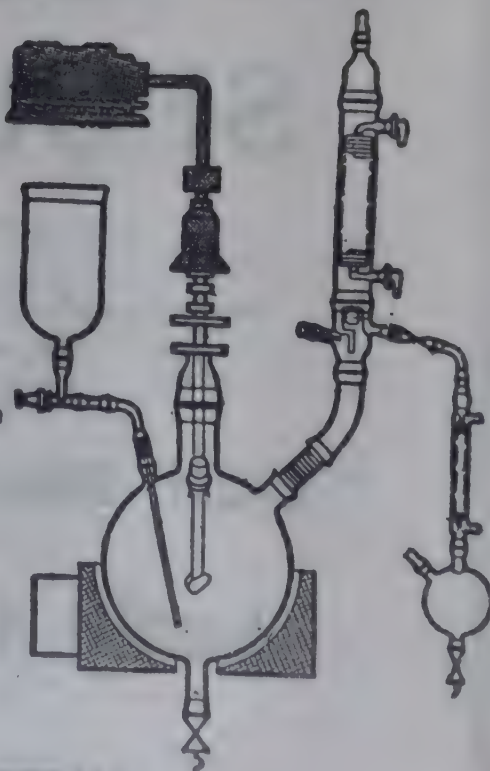
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Therefore, Tata Chemicals wishes to ensure on the one hand, that there will be no avoidable expenditure of foreign exchange on the import of soda ash and, on the other, to ensure that in the event of the need arising, imported soda ash must come in and a shortage situation must not be allowed to develop, the letter adds.

Moreover, the letter makes it clear that the discount of Rs. 50 over the basic ex-works bulk price of Rs. 2,450 per tonne will be offered to any customer who undertakes to buy from indigenous sources, and not necessarily from Tata Chemicals, alone.

LEVER TO ACQUIRE STEPHEN CHEM.

Hindustan Lever (HL) is to take over by purchase of equities from Punjab State Industrial Development Corporation (PSIDC) the joint-sector company Stephen Chemicals Limited. Consideration involved for the acquisition of 14,73,090 equities is around Rs. 3 crores and HL is paying Rs. 22 for each share of Rs. 10.

Other financial institutions are also selling their equities at the same rate and the total quantum of the shares to be bought works out 51 per cent.

Stephen Chemicals is a joint sector company engaged in the manufacture of soap and synthetic detergents promoted by PSIDC.

It may be recalled here that in August 1983 HL was permitted by the government to take over Stephens on lease for a period of five years in a bid to revive the unit which was sick since its inception and incurring losses. HL was paying a monthly rental of Rs. 22,000 plus additional service charges.

After its take-over on lease, HL injected new technology and capital for raw materials and also loaned plant and equipment as well as their managers for the revival of the sick baby. This had reportedly resulted in quick revival of the unit and more employment. Capacity utilisation of Stephen after lease was also optimised in the first year itself.

COPPER PRICES CUT; NICKEL, ZINC PRICES RAISED

The inter-ministerial committee of the government has reduced the MM-TC's selling prices of copper and increased the selling prices of zinc and nickel.

According to a press release, the selling price of electrolytic copper wire bars and high grade cathodes has been reduced from Rs. 73,000 a tonne to Rs. 72,000 a tonne, and the price of continuous cast copper wire rods from Rs. 80,000 a tonne to Rs. 78,000 a tonne.

The price of electrolytic high grade zinc has been increased from Rs. 35,500 a tonne to Rs. 38,000 a tonne and the price of special high grade zinc from Rs. 35,700 a tonne to Rs. 38,200 a tonne.

The price of nickel briquettes has been raised from Rs 3,50,000 a tonne to Rs 3,95,000 a tonne, nickel squares from Rs 3,50,000 a tonne to Rs 3,95,000 a tonne and nickel pellets, shots and strips from Rs 3,52,000 a tonne to Rs 3,97,000 a tonne.

According to the press release, the

prices of copper have been reduced due to fall in international prices. The prices of zinc and nickel have been increased due to rise in international prices and appreciation of pound sterling and US dollar vis-a-vis Indian rupee.

The new prices came into effect from May 2nd itself.

STYRENE IMPORT DUTY REDUCED

The Finance Minister has announced reduction in import duty on styrene monomer, a raw material used in the manufacture of plastics and rubber from 65 per cent plus Rs. 1700 per tonne to 30 per cent plus Rs. 1700 per tonne.

The Finance Minister also announced the reduction in basic excise duty on plastic woven sacks manufactured on circular looms from 12 per cent to eight per cent. He also reduced the basic excise duty on fabrics laminated with low density polyethylene from 15 per cent to five per cent ad valorem.



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REPLACEMENT, MODERNISATION

FACT moots Rs. 600 Cr. outlay

The Fertilisers and Chemicals, Travancore Ltd. (FACT) has submitted proposals amounting to Rs. 600 crores for replacement, modernisation, retrofitting and enhancing capacity of various units.

Mr. N. B. Chandran, chairman and managing director, FACT told newsmen in Bangalore on April 30, that the main thrust of the proposals was on replacing the company's three ammonia plants at Udyogamandal at a suggested outlay of Rs. 400 crores. The ammonia plants were more than 40 years old and had been expanded some 25 years ago. The three ammonia plants had capacities of 80 tonnes, 140 tonnes and 125 tonnes per day (tpd). "Nobody runs such small plants these days and even to achieve an annual production of between

90,000 to one lakh tonnes we have had to use 35 to 40 compressors to run these plants at 85-per cent capacity", he said. FACT had therefore suggested that these three plants be replaced by a 900-tpd ammonia plant and a 1,100-tonne urea plant.

FACT had also submitted a Rs. 40-crore to Rs. 50-crore proposal for retrofitting the 600-tpd ammonia plant at the Cochin division so as to minimise the costs of production and energy consumption. Another proposal for between Rs. 25 crores to Rs. 30 crores had been submitted for setting up at the Cochin division another sulphuric acid plant with a tpd-capacity of between 600 to 1,000 tonnes, in addition to the existing 1,000-tpd plant.

Apart from this, FACT had also submitted a Rs. 5-crore to Rs. 6-crore pro-

posal for diversifying into the manufacture of transmission-towers and disposable syringes at the Givonal Binny engineering unit at Cochin whose assets it had taken over recently. Mr. Chandran stressed the need for public sector undertakings to diversify instead of sticking to one product line for which the market could fluctuate.

A detailed project report for the replacement of the Udyogamandal ammonia plants (which he described as "absolutely essential") and the retrofitting of the Cochin plant would be submitted by September 1988. "Our aim is to have these included in the Eighth Plan," he said. He was also planning to submit a proposal for a third phosphoric acid plant on the western coast at a cost of between Rs. 35 crores to Rs. 40 crores, in addition to the company's two existing plants.

Mr. Chandran stated that FACT was going to put up a 12 mw captive power plant at Cochin which would enable the production units there to put up with a power-cut of even 50 per cent. Tenders had been called for and discussions were going on with BHEL. Power requirements of the production units at the Udyogamandal division would, he said, be met by the captive power plant for the Rs. 315-crore ammonium sulphate caprolactam project which was expected to be commissioned in January 1989.

Mr. Chandran admitted that the cost for the ammonium sulphate caprolactam project had gone up by Rs. 55 crores, out of which Rs. 25 crores was due to the yen appreciation and Rs. 30 crores due to the revised customs duty on project imports.

Mr. Chandran, stated that a consortium of FACT, Ircon, BHPV and Bridge & Roof, Calcutta, had been short-listed by the government of Algeria for a Rs. 600-crore phosphate fertiliser plant at Tebassa. FACT was also tying up for ammonia and urea technology transfer agreements with a leading European consultant for projects in Third World countries.

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ICMA AGM:

Buffer stock for chemicals planned

"In order to guard the domestic chemical industry against the international price situation and availability, the government aims to build up buffer stocks of raw materials and we plan to sell them at pooled prices" said Mr. H.K. Khan, Secretary, Dept of Chemicals & Petrochemicals, at the 47th annual general meeting of Indian Chemical Manufacturers Assn, at New Delhi on 27th April 1988. Earlier the outgoing ICMA President Mr. K.R.V. Subrahmanian welcomed the Chief Guest Mr. Khan and others.

The Indian Chemical Mfrs. Assn. conferred Honorary Membership of the Association on Dr. T.P.S. Rajan in appreciation of his meritorious service to ICMA for nearly three decades.

Welcoming the Chief Guest, the outgoing ICMA President Mr. K.R.V. Subrahmanian said that the presence of Shri Khan in this occasion was particularly welcome, since his counsel, guidance and support was of vital importance to the chemical industry.

He said:

"The Annual Meeting of the Association has always provided an ideal opportunity to review the current status of the chemical industry in

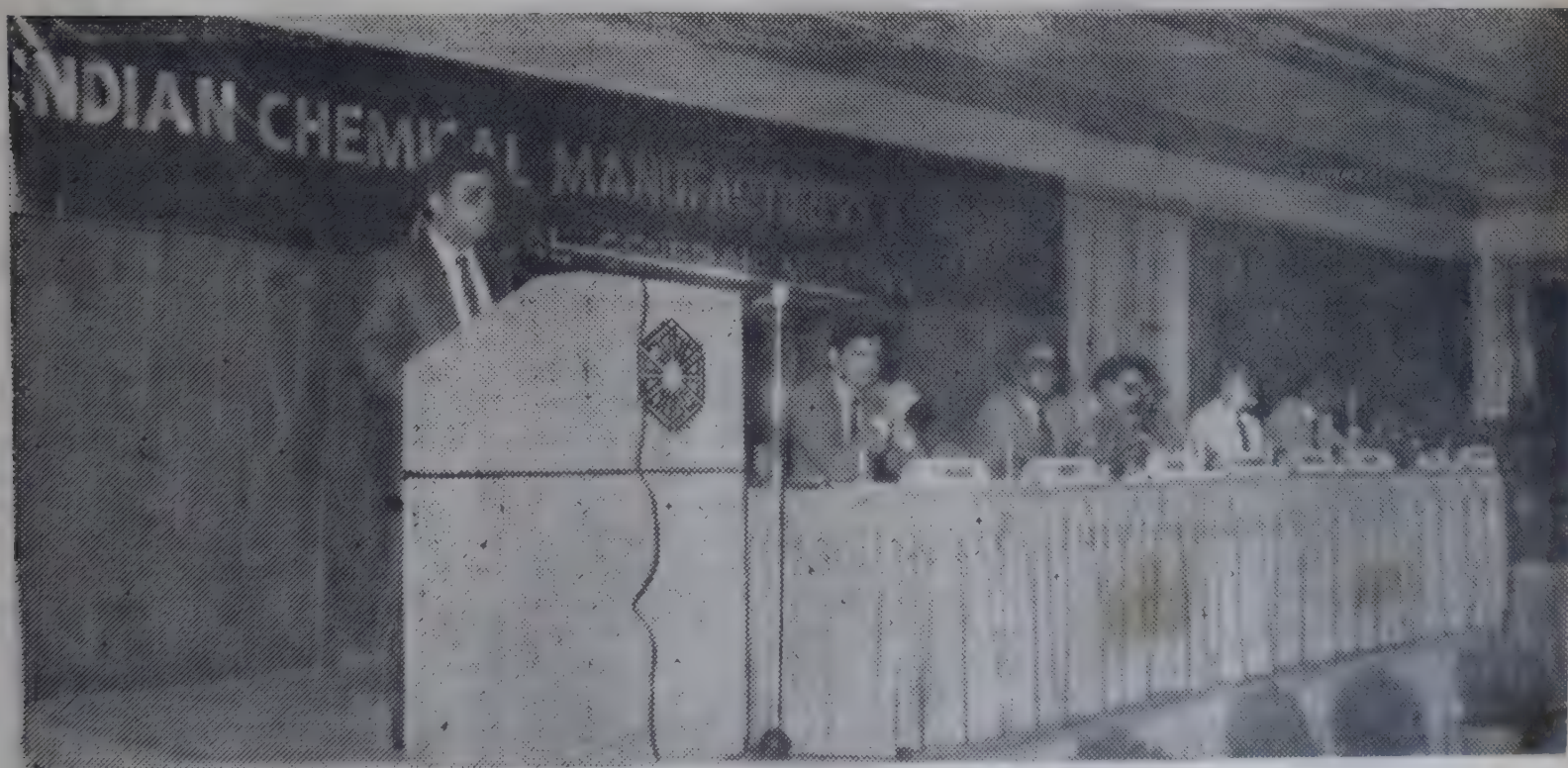
all its aspects and visualise its future growth prospects. In keeping with this tradition, I shall attempt to share with you a broad scenario of the industry, as we in the ICMA see it. The Industry which comprises several sectors, roughly accounts for ten per cent of GDP in terms of turnover. The average annual growth rate of the industry during the past three years has been 10 to 12 per cent and its contribution to exports during the last year has been of the order of Rs. 500 crores, which constitutes 5 per cent of the total commodity exports. Thus, the chemical sector represents an important segment of Indian industry. However, the all-encompassing character of the chemical industry and its impact on almost every aspect of our lives becomes evident only when we look beyond the figures.

In a recent paper entitled "Chemical Industry and Society", Prof. M.M. Sharma, the renowned chemical technologist made the following observations:

The chemical industry is highly science based and is also an enabling industry and provides valuable, and often indispensable, inputs into various product-oriented industries. Thus, without the chemical industry,

there would be no electronics or micro-electronics, refrigerators, recording tapes, automobiles, laser discs, supermagnets, etc. Even the power industry depends a lot on the chemical industry and indeed, modern boilers call for ultrapure water where dissolved solids have to be brought down to ppb levels besides treating water for dissolved O₂ removal and for prevention of corrosion; insulation requires high polymers. Even capacitors critically depend on the chemical industry. In the case of the nuclear power industry, the dependence is similarly great. What is more striking is that the ancient civilizations had also felt the need for the chemical industry as we know today.

We relieve pain and eliminate ulcers through safe drugs even though in their manufacture, we have to handle 'nasty' chemicals. The history of the chemical industry is replete with examples of converting toxic and dangerous chemicals into safe value added products. Thus, one of the most poisonous substance, hydrocyanic acid, has been used to make synthetic wool (acrylic fibre), lactic acid, transparent plastic-poly-methylmethacrylate, methiomine, etc. It is even more striking that gold,



Mr. H.K. Khan, Secretary, Dept. of Chemicals & Petrochemicals, Govt. General Meeting of the ICMA at New Delhi on the 27th April, 1988.

of India, inaugurating the Annual

which is adored in our country, will not be available without cyanides. The so-called reactive dyes which are used for cottons will not be available without cyanides. Phosgene is essential in the manufacture of polyurethanes and polycarbonates and some drugs and agrochemicals. The chemical industry is multi-disciplinary, has an excellent track record of managing innovations and is a continuing shining example of the motto 'More from less'.

The purpose of my referring to these product applications is merely to drive home the point that the products of the chemical industry have much wider use than is actually realised in our country. Future directions of growth of this industry should therefore be envisioned in this context.

The world over, the chemical industry is currently poised for rapid growth. New advancements in the field of bio-technology will usher in an era of further technological and product development. Another field with exciting possibilities is the variety of engineering plastics and speciality polymers, such as polymer alloys, inorganic polymers etc., which have wide-ranging industrial applications with considerable potential for saving energy and material usage. We in India should gear ourselves to participate in this exciting adventure of rapid progress and change.

ISSUES OF CONCERN

Government Policy and the Chemical Industry

Let me now briefly dwell on some policy aspects as they apply to the chemical industry. The chemical industry in India comprises many different segments with their own special techno-economic needs and problems which do not allow for easy or across-the-board policy prescriptions. In an overall sense, policy coordination becomes extremely crucial, because of certain structural conflicts inherent in the Indian context. There is the locationally dispersed alcohol-based industries, the technology and capital intensive petrochemicals sector, the downstream units for the manufacture of agrochemicals, heavy and fine chemicals, dyestuffs and the pharmaceutical sectors to mention only a few. A distinct feature of the industry is the strong vertical and

horizontal interlinkages. Therefore, any policy, be it in the fiscal or foreign trade regimes, has to be a well-integrated and harmonious one which balances disparate needs in the overall longterm interest of the country.

High Production Costs

As far back as in 1975, the ICMA had identified 'high-costs' as the major hurdle in the path of the indigenous industry becoming internationally competitive. Starting with high capital costs (on account of high landed cost of imported equipment) the indigenous manufacturers also face disadvantages vis-a-vis their foreign counterparts by way of high costs of basic feedstock and other raw materials. Feedstocks like naphtha are available to Indian chemical producers at nearly two and a half to three times the prices paid by international chemical manufacturers (with the exception of fertilisers where naphtha when used as feedstock enjoys a concessional price). The ICMA had submitted a detailed plan to the Government elucidating the beneficial impact of a reduction in the price of naphtha on downstream petrochemical products. We believe the proposal has evoked sympathetic consideration and are hopeful of an early and favourable decision, as it constitutes a vital pre-requisite for the growth of this sector where substantial investment is envisaged by the nation.

Indirect Tax Burden

High incidence of customs and excise duty on inputs further aggravate the problem. The overall duty incidence varies from one sector to another, the highest duty — despite recent cuts — being on synthetic fibre and polymer based products. It is reasonable to claim that the chemical industry as a whole faces one of the heaviest indirect tax burdens on its products, on an average between 60 to 70 per cent cumulatively.

This is probably an outcome of the perception that the products of the chemical industry go mainly to satisfy the demand of the relatively affluent sectors of society. This is an absolutely erroneous impression and needs to be corrected. The products of chemical industry satisfy the demand for essential items of food, clothing, shelter and health by all sections of the country e.g.

agro-chemicals and fertilizers help improve the yield from the land for the farmers while drugs improve the health and longevity of poor and rich alike. It is our considered opinion that the potential untapped demand for the products of the chemical industry in a country of our size is huge and can be unleashed provided their prices are reduced through a policy of reasonable feedstock pricing and moderate excise levies on finished products.

It is against this background that we in ICMA welcome the excise and customs duty reductions on a variety of chemical intermediates in the recent budget. We hope that the process of cost reduction through this route will be carried forward further and the benefit of lower duty will be extended to more items. It is our firm belief that lowering of excise duty on industrial products serves to stimulate demand and leads to higher revenue accretion from greater output. We strongly urge the Government to expand the list of items that have been extended excise duty relief in this year's budget. ICMA has already made some suggestions in this regard. We would also like to place on record here that all sectors of chemical industry have passed on the net benefit of lower duty to the consumer.

Import-Export Policy

The recent import-export policy has expanded the list of OGL items and placed several chemical intermediates in this list. As a general principle, one can have no objection to placing critical raw materials and inputs on OGL. However, in areas where the country has achieved efficient import substitution for years — such as certain agrochemicals and their intermediates — placing the products on OGL and/or giving substantial customs duty relief is likely to do irreparable damage to the domestic production base for these items. The chemical industry fully shares the Government's concern for improving the lot of the drought-affected farmers by bringing down the prices of vital farm inputs. However, we submit that this objective should be achieved without frustrating the indigenous capacity set up at high capital cost to serve the Indian farmers in both good times and bad. Rather than placing such pesticides for which adequate installed capacity

exists in the country on OGL and reducing customs duty thereon, the objective of lowering the final cost of pesticides to the farmer can be better achieved by exempting the concerned pesticide intermediates produced in the country from excise duty. This would seem to be a far more fair and rational solution in the long term interest of the country. The chemical industry is heartened by the Prime Minister's recent declaration that the Government is neither interested in large scale import substitution nor for a wholesale open door liberalisation policy, but rather stands for planned development and self-reliance with competition playing a greater role within this framework. The chemical industry is ready to take up the challenge of competitiveness provided policy support is given to efficient production and its efforts are not thwarted by unfair and inequitable incentives for imports.

Optimum size

Yet another disadvantage faced by the chemical industry leading to higher costs is that most of our plants are of a much smaller size, about one-eighth to one-tenth of modern plants in other parts of the world. This has denied us the benefits of economies of scale. No doubt, permitting the existing units to increase their operations to minimum economic size, extending the benefit of automatic growth or re-endorsement of higher capacities are welcome and beneficial policy initiatives as far as they go. These measures will help in optimising plant capacity in the industry with minimum additional investment. However, in so far as the chemical industry is concerned, we seem to be fast reaching the limit of considerably adding to capacity through this route. When an industry reaches a new threshold in its development process, what is needed is an entirely fresh approach to technology and size. Green site plants should be allowed to go in for the state-of-the-art technology which often tends to be a function of size as well. There are of course other parameters such as energy efficiency, raw material consumption ratio, etc., which are equally important.

Liberalisation and the Chemical Industry

The chemical industry welcomes the process of policy liberalisation, such as delicensing, broad-banding,

re-endorsement of capacities to the highest level of production achieved, allowing units to expand to minimum economic size etc. The ICMA is currently making a quick review of the impact of the various policy liberalisation measures on the industry and will be submitting a detailed note to the Government on its findings. The prima facie findings would, however, seem to indicate that a major hurdle in deriving the benefit from these policy initiatives has been the locational constraint. Quite frequently clearances are held up for long periods of time not merely on technology and other factors but on grounds of apprehended environmental damage. Given the high degree of public and official sensitivity to the issue, the tendency is to play it overly safe and impose such conditions and standards that virtually no location qualifies as being safe or no unit can pass the test of acceptability. While I take this opportunity to thank the Government for issuing a clarification recently that the locational constraint will not apply to units expanding to minimum economic size, I see no reason why this principle should not be extended to other schemes of re-endorsement of capacity as well. This problem needs a rational and not a dogmatic approach and each case needs to be judged on its own merits. Provided the individual undertaking can ensure to the satisfaction of the authorities that expansion of its operations will pose no additional hazard to the environment and that the absolute load of pollutants will not exceed the limit permitted for the existing plant, such growth should be automatically sanctioned.

In keeping with the spirit of liberalisation, investments upto Rs. 25 crores should be delicensed and broad-banding should be extended to more chemical products. Government should also favourably consider automatic licensing for products in the core sector which have been developed through in-house R & D efforts of all undertakings including MRTPL/FERA Companies. The impact of such policy changes would be tremendous in terms of fuller utilisation of capacities and diversification of products.

Standing Committee on Trade and Tariff

For many years, the ICMA has been highlighting the need for es-

tablishing a Standing Committee on Trade and Tariff to monitor international prices and availability of vital inputs on a continuing basis and to suitably adjust import duties and controls in such a way as to balance the interests of consumers and indigenous manufacturers. An outstanding example of the havoc that can be caused in the absence of such a mechanism can be found in the total disarray in which our plastics processing industry finds itself today. Two consecutive cuts in import duty have failed to afford adequate relief to indigenous users as the costs of plastics raw materials have continued to soar in the world market while the world supply position has also become tight. In cases like this, the suggested Standing Committee through continuous dialogue with industry and trade can fine tune import duties and policies to ensure that indigenous needs are met in a timely fashion and evolve a tariff structure that can cope with the vicissitudes of fluctuations of prices and of exchange rates in international markets.

Planning for Growth

The efforts of such a Committee would have to be backed by long-term action. In the case of most products like LDPE, HDPE, PVC, etc., there is a vast unsatisfied demand even at current levels of per capita consumption in our country. According to the current estimates, India may have to import 3,50,000 tonnes of polymers this year. The break-up of this quantity is one lakh tonnes each of LDPE and HDPE, 1,25,000 tonnes of PVC and 25,000 tonnes of polypropylene. Earlier attempts to import polymers from established producers have met with only limited success since all of them are committed to supplying their products to established buyers.

The present crisis can be traced to the delays in granting and establishing additional petrochemicals capacity in the country. An Apex Committee appointed by the Union Government in 1985 to assess, among other things, the projected demand of petrochemicals had clearly warned of an impending crisis with demand far exceeding the supply of basic raw materials such as ethylene, LLDPE, LDPE, PVC, Polypropylene and MEG.

It is, therefore, essential that our policy focus is on the acceleration of local capacity creation to obviate continuing dependance on imports. In the context of emerging shortages of plastics and polymers in world markets, we should not become willing victims to supply constraints and price escalations which will entail outgo of precious foreign exchange and add to the erosion of our exchange reserves.

The finding of hydrocarbon resources in Bombay High, Gujarat and other locations in the eastern and southern basins has brightened the prospects of locating petrochemical complexes in several regions in the country which will also make the petrochemical industry locationally dispersed. In order to fully reap the benefits of the feedstock available, the projects already cleared should be implemented without further delay. The Maharashtra Gas Cracker Complex which is expected to go on stream in 1990 will add to our capacity for ethylene with streams of LDPE, HDPE, etc., but considering the demand structure, MGCC alone will not be able to meet the total requirement of the industry. According to one estimate of requirement, we need an ethylene cracker going on stream every three years. Current supply shortage in the meantime needs to be tackled on a war footing.

Safety & Environment

There is today in the minds of the public and opinion leaders an unfavourable or even a negative view of the chemical industry as a whole from the angle of safety and environment protection. It is said that bad news travels farther and faster and makes an everlasting impression. Little is it realised that the industry has been gearing itself to ensuring greater discipline in industrial safety and pollution control aspects. Notwithstanding the few unfortunate cases of industrial accidents and environmental pollution, the record of the Indian chemical industry in safety and pollution control measures has been, even by international comparison, a good one. If rapid industrialisation is the goal, there is a need to strike a sensible balance between environmental purity and industrial growth. It is nobody's case that all caution should be thrown to the winds or industry freed from environmental

standards by which cases are judged resulting in inordinate delays or abandoning of projects might deny the benefits of industrial growth and employment to the country as a whole. In most instances, the growth of urban conglomerations in the proximity of what was once considered a safe location for setting up an industry, has been a major cause of the problem. Again, the issues involved are complex and many sided, and we should not succumb to the temptation of a strait-jacket solution.

The need for greater safety consciousness and pollution control measures in the chemical industry has today permeated to all levels of employees and is particularly high in supervisory and managerial ranks. Experience is eulogised as being the best teacher and the few instances of accidents or pollution threats from chemical units have served to further sensitize managements to the need to take a proactive and fail-safe approach to safety and pollution control measures. During the last year, we in ICMA have spent the largest amount of managerial time and resource to address one question, namely, "How to improve safety standards and generate greater consciousness of safety among the workers?" A special Task Force is entrusted with the task of developing a training programme for chemical plant operators, somewhat on the lines of boiler operators in industrial establishments.

Outside the industry, higher institutions of learning such as the Institutes of Technology and major universities have incorporated safety and pollution control as part of the syllabus for the degree course in chemical engineering largely as a result of the on-going dialogue between ICMA and these institutions of learning. Sharing experiences and information in this vital area with organisations both in India and abroad has served to update knowledge and thereby reduce the occurrence of accidents or mitigate pollution hazards. For example, the ICMA has been able to secure the co-operation of the Chemical Industries Association of the United Kingdom to issue Reprints on Safety and Environment. These constitute a set of eleven reference publications on subjects of vital interest includ-

handling major emergencies, Evaluation and Control of toxic substances, Guidelines for safe warehousing of hazardous substances, Guidelines for storage and use of highly flammable liquids, Chemical Protective Clothing and so on. Recently, the Association also released a valuable publication on "Lessons from Typical Accidents in the Indian Chemical Industry", "Chemical Safety Data sheets" and "Floppy Diskettes" for over 150 chemicals. "Environmental Guidelines for Safety in Industry — Report of the Working Group" and several other publications to focus attention on these problems leading hopefully to concrete steps towards safety and healthy operation in chemical plants.

I understand that in the U.S. opinion leaders such as Parliamentarians interact periodically with that country's Chemical Industry Association in an effort to understand the projected investment, performance and problems of the chemical industry. We in ICMA would be glad to keep all channels of communication open for a similar exercise in our country.

ICMA Matters

To help the ICMA function more effectively, a major reorganisation of its set-up has been undertaken and the Headquarters of the Association have defacto shifted from Calcutta to New Delhi to facilitate effective coordination and interaction with the various wings of the Government of India. The reorganised Secretariat is headed by Shri Parthasarathy as Chief Executive. Consistent with its all-India character, the ICMA will also be strengthening its regional operations in Bombay, Calcutta and Madras. I would like to take this opportunity to thank the Indian Chamber of Commerce in Calcutta, to whom the ICMA has been affiliated over more than four decades, for their help and co-operation and secretarial assistance provided to the Head Office of the Association. We look forward to continuing this association with ICC albeit in a limited way, through our Eastern Regional Office.

An important achievement during the past year has been the formation of a Trust to perpetuate the memory of the great visionary and pioneer of the chemical industry in India, Acharya P.C. Ray who four

1938. The objective of the Association is to search and propagate knowledge in the field of chemical technology and its application to human welfare by organising periodic lectures by eminent experts.

The Government has amply demonstrated its confidence by affording the ICMA representation on the Ex-Committee for Chemicals, the Development Council for Chemicals, on a SubGroup of the Development Council for Petrochemicals. ICMA has also been associated in various committees of national importance such as the Expert Committee to consider Fiscal Benefits, Investment in Safety, the Committee on Introduction of Mandatory Public Liability Insurance for Hazardous Industries, the Inter-Ministerial Committee on Hazardous Chemicals etc. Recently, the United Nations Environment Programme invited the ICMA to join its deliberations to review the draft handbook on "Awareness and Preparedness for Emergencies at Local Level Process". The ICMA has accepted the honour of being associated with this review and was represented at the Paris deliberations by Dr. K. Arayanan, Vice-President, Southern Region. I am also glad to inform you that the President of the Association has been invited to be a member of the Research Council of the National Chemical Laboratory at the CSIR, an honour which we have gratefully accepted.

INAUGURAL ADDRESS OF MR. K. KHAN, SECRETARY, DEPARTMENT OF CHEMICALS AND PETROCHEMICALS, GOVT. OF INDIA.

It has been my privilege to have been associated with this Association and to have participated in their meetings for many years now in various capacities. I have, therefore, been a witness to the growth of the industry in the past few years, some time even as a member of the industry and also the remarkable role played by the Association in the development of the industry.

The chemical industry is one of the oldest industries in the country and was in existence even at the dawn of Independence. However

it gained impetus only in the late 50s and early 60s. But since then it has made rapid strides and currently the chemical industry's share in the national gross industrial output is about 40% as compared to 8% in 1970-71. Its growth rate is also a remarkable 12% which is much higher than the average industrial growth rate. The capacity utilization is a healthy 70% with a total production value of Rs. 15,000 crores.

The chemical industry was initially based on alcohol and even today many of these industries rely on alcohol as a raw material. In the years 1984 to 1986, we had witnessed a shortage of molasses and alcohol with the result that many chemical industries faced constraints in capacity utilization. However, Government recently introduced a more liberal molasses and alcohol policy which permitted optimum use of molasses while trying to guard the industry against exorbitant alcohol prices. Fortunately, this coupled with bumper production of molasses has led to surplus availability of alcohol. I do hope that with this free availability the chemical units based on alcohol will be able to not only utilize their full capacity but expand to more economic sizes. The Governments of surplus states have also heeded the call of the Central Government and have reduced export pass fees on export of alcohol which will act as a further relief to the industry.

However, the new trend all over the world is towards utilization of petrochemical feedstock hence even in India, though the alcohol based chemical industry will continue to be encouraged because alcohol is a renewable source of raw material, Chemical industries based on petrochemical will have a bright future in our future development. Your President has rightly raised the question of availability of petrochemical raw materials. There is no doubt an imbalance in the country today between the availability and the demand for polymers. While we have become surplus or self-sufficient in the field of synthetic fibres and yarn, there is still a large gap in the area of polymers, especially LDPE, HDPE etc. The ultimate solution lies in increasing our indigenous capacity. As you know, this Department commis-

sioned a Perspective Plan to look at and to cater to the needs of the country till the end of this century. Based on this Perspective Plan, we have prepared a blue print which should provide for at least three international size petrochemical complexes based on gas or naphtha by 1994-95 and a 4th complex by the end of the century. The feasibility studies for these complexes are under active consideration of the Government and we are keen that they should be finalised in such a way that they can be commissioned from 1992 onwards. In the meanwhile, the Maharashtra Gas Cracker will provide immediate relief as it is likely to be commissioned by the end of 1989 or early 1990. In addition to this at least two to three aromatic complexes have been envisaged and letters of intent have been given or will shortly be given for Madras and Salempur in U.P. Till such time as these complexes go on stream, we will have to import the raw materials and Government is committed to such imports to sustain the local industry. The international situation with which you are familiar shows depleting supplies and hardening of prices. Therefore, in order to guard the domestic industry against these fluctuations we aim to build up buffer stocks of raw materials and we plan to sell them at pooled prices. This is the first time that such an attempt has been made in this country. As you may have read our first delegation visited Saudi Arabia and France to discuss long term availability and I am happy to say that we received extremely good response from these countries. Another proposal that was discussed was to import intermediate products and convert them into the required polymers in the country so that we may not have to wait till the crackers are commissioned.

Import of intermediates and even import of ethylene have been discussed and we hope that projects can be commissioned based on imported ethylene or intermediates. These steps, I feel, will ensure that the requirements of raw materials for the chemical industry based on petro-feedstocks will be adequately met.

The main problems affecting the chemical industry, as I view it, are

the need to modernize technology, to expand plants to international standards, to take steps for the conservation of energy and to pay special attention to environment. I feel that apart from dyestuffs and to some extent pesticides, we have not yet been able to take adequate steps in modernizing technologies and in affecting economics of scale. Keeping these requirements in view, the Government of India took a number of steps towards liberalizing our approach to the industry by delicensing 17 items, placing 28 groups of chemicals under the broad-banding schemes and also permitting re-endorsement of capacities based on actual production. In addition, minimum economic size has been determined for 10 major chemicals. I feel that these steps should enable the industry to develop freely and to reach to viable capacities. Special schemes for helping in modernization specially the recent liberalization of the TDF scheme which allows import of capital equipment and raises the ceiling to Rs. 2 crores per unit should give the industry an impetus towards modernization of technology. Recently, Government has further liberalized the capacity endorsement scheme for permitting companies to produce to the maximum extent with minor addition to their plant and equipment and then come to Government for re-endorsement at the end of 7th Plan based on the past production during this period. This I feel is a great boon to the industry and should give an impetus for every unit to try to reach its maximum productive capacity. I do hope that with the help and guidance from the Association, the chemical industry will take full advantages of these measures for planned growth. Unfortunately, we have not yet received adequate feedback from the industry regarding its response to the schemes. The Department is keen to consider further delicensing and broad-banding provided we are assured that the industry has and will respond positively to these measures. There are no doubts some constraints that may hinder you from taking full advantage of these schemes. Your President has already mentioned the locational problems. It is with this idea that we have set up a Development Council for Chemicals in the Department. We can call a special meeting to discuss these measures and your pro-

blems in fully utilizing the reliefs given to you so that we can overcome whatever constraints that may still stand in the way.

Some welcome steps have already been initiated in the industry to conserve energy. The efforts made by a few caustic soda units to change over to the membrane cell technology is one instance of this. I do hope that other caustic soda units will follow suit. Tata Chemicals have also made pioneering efforts in this direction and the new soda ash plant of Gujarat Heavy Chemicals is an instance of international size plant based on the latest technology with minimum energy consumption. Our expectations are that other industries e.g. carbon black, sulphuric acid and methanol plants will follow suit. Government has also given various concessions towards efforts for energy conservation including the customs duty reduction for components and auxiliaries. There are various systems such as the heat recovery system, micro processors based control system etc. which are available and I would impress upon the Association the need to undertake a concerted drive in this direction. As I have said earlier the capacity utilization in this industry is highly satisfactory. Even more satisfactory is the fact that we are today self-sufficient in caustic soda, soda ash and should become shortly self-sufficient in phenol and methanol. With the increased availability of alcohol, I would appeal to the acetic acid manufacturers to increase their capacities to cater to the needs of the new PTA plants that are coming up. One industry which has a great potential is the pesticides industry. We have seen a great fillip in the pharmaceutical industry. I look forward to a similar growth in the pesticides industry especially with the strides made in the field of bio-technology. The industry has no doubt some problems in registration and licensing procedures and we are trying to smoothen their path. The next subject of concern is regarding pollution. The chemical industry is naturally most prone to polluting the environment. However, in India they have shown great environment consciousness. Subsequent to the terrible tragedy that took place in Bhopal, we have geared up the entire pollution control machinery but

CONFERMENT OF HONORARY MEMBERSHIP ON DR. T.P.S. RAJAN : CITATION

Dr. T.P.S. Rajan is one of the foremost experts on Fuels and Energy in the country and his talents have been widely recognized both at home and abroad. He has served the Indian Chemical Manufacturers Association for nearly three decades with exemplary zeal and devotion. He became the Honorary Secretary of the Bombay Regional Office in 1962, the Vice Chairman in 1972 and was the Chairman during 1982-84.

When the management of the Association's monthly journal **CHEMICAL INDUSTRY NEWS** was shifted to Bombay in January 1972, Dr. T.P.S. Rajan assumed charge as its Honorary Editor, a responsibility which he continues to handle till today. Through his wide knowledge of the Chemical Industry world-wide, his sensitive appreciation of the issues before the Indian industry and his untiring efforts, Dr. Rajan has built up the Journal into a forceful and responsive organ representing the interests of the Indian Chemical Industry.

In appreciation of the valuable services rendered by Dr. T.P.S. Rajan, the Indian Chemical Manufacturers Association has great pleasure in conferring on him Honorary Membership and pleased to present him this memento on this happy occasion.

I feel that mere action on the part of Government will not solve these problems unless industry itself is alive to these problems. Fortunately, the chemical industry has shown a remarkably positive response in this regard. The Association informs me that it has been bringing out literature to educate its members for adequate interaction among them. This is a very commendable step and I compliment the Association on it. However, there are some old units which are causing anxiety to us. We often read of accidents in different parts of the country. The Department has brought out detailed guidelines listing the risk hazards in various types

ustries. We have also asked the strict authorities to prepare onsite off-site emergency plans. I would like to appeal to the industry to take up the scheme of safety audit in right earnest. We had discussed in the past the question of loans and relief in import duty on equipment required for safety control. Some concessions have already been given and we expect the industry to take full advantage of it. Finally, I would like to stress on the efforts to be made on the export front. Commendable work has already been done in this field. In the year 1987-88, the over-export of chemicals in 11 months ended 29.2.1988 is expected to be around Rs. 570 crores as against Rs. 400 crores for the corresponding period of last year and it is expected that when the figures of March are available the exports may cross Rs. 700 crores. We should set before ourselves a target of Rs. 900 crores for the current year. There is great potential specially in the field of organic and inorganic chemicals for which there is a high demand in international markets. Your President has rightly stressed the need to make inputs available at international prices. While it has already been announced that for exports inputs will be supplied at international prices, we are also considering the question of re-

ducing costs of inputs such as naphtha, benzene etc.

To sum up, when we think of the chemical industry we should consider it in its entirety including the entire range of chemicals. It then becomes one of the most important dynamic and progressive areas of industry. Recognizing its importance, the Department has not only set up a separate Development Council for this segment of industry but has also set up a Committee to prepare a Perspective Plan for the chemical industry till the year 2000 A.D. This plan should be published during this year.

Our industry today has developed such resilience that it has been able to withstand even the shocks of the worst ever drought in the history of the country. The chemical industry has played an important part in this growth but our aim is to help the national economy to gain a greater growth rate than projected so far. For this purpose I am of the view that Government and industry can work in close co-operation to achieve these objectives. Within the Department we have, therefore, created these mechanisms of Development Councils but I believe even more frequent inter-action between the Associations such as yours and my Department are necessary and our doors are always open to representatives of your industry coming forward

with new suggestions and new ideas for improvement. The ICMA has played an important role in the development of the industry. They have interacted closely with the Department and with all Ministries of the Government of India for which I must congratulate the out-going President and the members of the Committee. I offer my best wishes to the incoming President and I am confident that under his leadership the excellent work done by the Association will continue and new links will develop, between the Government and the industry. I wish to thank Mr. Subrahmanian and all of you for having invited me here and given me the pleasure of attending the inaugural session of your association.

ICMA OFFICE-BEARERS

The following have been elected as office-bearers of the association for the current year:

Mr. S.M. Datta, President; Mr. Atmaram Saraogi, Vice President; Dr. K. Narayanan, Regional Chairman-Southern Region; Mr. S.N. Tandan, Regional Chairman-Northern Region; Mr. K.V. Mariwala, Regional Chairman-Western Region; Mr. O.P. Malhotra, Regional Chairman-Eastern Region.

Mercury prices up

With the advent of summer, mercury has registered a steep rise of Rs. 1,000 to touch a new peak of Rs. 9800 per flask (34.5 kg.) in the chemical and pharmaceutical market last month.

The sustained demand from up-country centres like Andhra Pradesh and Calcutta and other major users coupled with an acute shortage of stocks have led to a steep rise in prices in the highly-sensitive mercury market.

According to traders, mercury has recorded a stupendous rise from Rs. 8800 per flask quoted on April 1,

1988 to touch a new peak of Rs. 9800 per flask on recently thus showing a rise of Rs. 1100 during the past one month.

Explaining the rise in prices traders said, during the early part of the current year several actual users from different States had imported huge quantities of mercury, but poor demand from consumers led to accumulation of stocks.

This forced them to throw away the excess stock in the open market due to which mercury prices slumped to around Rs. 8500-8700 per flask as against Rs. 9500-9700 per flask

quoted by both the Minerals and Metal Trading Corporation (MMTC) and the State Trading Corporation (STC).

The situation is different now with the market witnessing an acute shortage of stocks and rising demand. Besides, rumours that a huge consignment of mercury been held up at customs has deteriorated the situation.

Traders said, mercury is likely to cross the Rs. 10,000 mark since its prices in the international market is also rising. But however, if MMTC reduces the supply rates, prices are likely to chart a reverse course.

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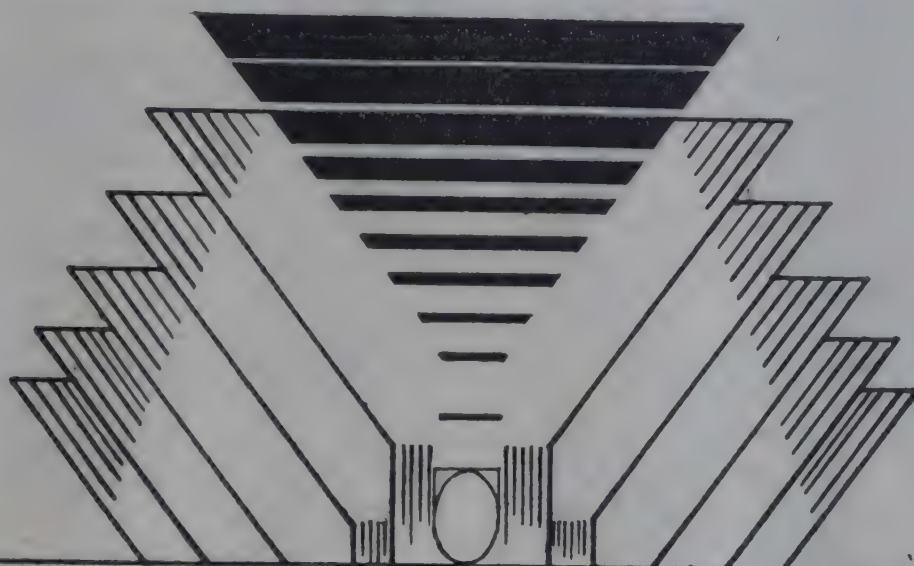
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Consumption of plastics in India 'must go up'

The per capita consumption of plastics in India is miserably low, at 0.6 kg compared to 100 kg in the advanced countries and the world average of 14 kg, according to Mr. H. K. Khan, Secretary to Government of India, Department of Chemicals and Petrochemicals.

In his inaugural speech (read out in his absence) at the All-India Plastics Fair — "Plastofes '88" — organised by the Central Institute of Plastics Engineering and Technology (CIPET), he said that at present our indigenous production of plastics raw materials is only 5 lakh tonnes. But with the expansion of the IPCL, and establishment of plants like the MGCC unit and other petrochemical complexes, this is expected to double to 10 lakh tonnes by 1990.

With the number of processing units also increasing from 10,000 to 20,000 during the same period, the manpower requirement in this sector would be about three lakh persons, of which 50,000 would have to be technically trained persons. To meet this

challenge the Government planned to expand the activities of CIPET to all regions of the country. In the seventh plan, five regional extension centres of CIPET, in addition to those at Madras and Ahmedabad, would be set up at Lucknow, Hyderabad, Bhubaneswar, Bhopal and Imphal.

Mr. Khan said that of the actual outlay of Rs. 9.4 crores sanctioned by the Centre in the seventh plan, Rs. 8.14 crore would go for developing these new extension centres. Each regional centre would concentrate on development in specialised areas such as teletronics, automobiles, engineering, housing, packaging, agriculture and water management. He added that there were opportunities for the plastic industry to equip itself with the latest developments in the field. There was also scope for quality control, standardisation, design, tooling and specialised fabrication in application.

Felicitating CIPET on the occasion, Chairman and Managing Director of SIDCO J. R. Ramanathan said that, with an assistance of 3.2 billion yen

from the Japanese government, SIDCO was now engaged in the task of setting up five high technology functional industrial estates in areas such as drug and pharmaceuticals, medical electronic equipment, automobile ancillaries and hosiery garments.

Mr. Ramanathan suggested that CIPET take a lead in initiating such a venture and said that SIDCO would be interested in collaborating with it in such a venture.

Addressing the meeting Mr. S. K. Mukherjee, Director (Personnel), IPCL said that his company provided the Institute raw materials, for development and application, and would continue to extend support in the future.

Director of CLRI Dr. R. B. Mitra felicitated the Institute for organising the five-day exhibition.

Welcoming the gathering Director of CIPET Dr. I. S. Bhardwaj said the objective of the Institute was not to remain a "motley group of laboratories" but become a vibrant institution fully alive to the increasing needs of the country.

RELIEFS TO PLASTIC SACK INDUSTRY WELCOMED

The All India Flat Tape Manufacturers Association has welcomed the reliefs to the plastic woven sack industry, announced recently by the Union finance minister and at the same time expressed its reservation that the reliefs would not be of any appreciable help to the industry.

In a press release in Bangalore the association said that while the reduction in duty on fabrics laminated with low density polyethylene from 15 to five per cent was welcome there was no rationale for the imposition of duty on laminated fabrics in the first place as duty was being paid at the tape stage itself. According to them the 'unwarranted additional burden' in the intermediary stage of lamination curbed the scope for diversification in the industry.

The release said that the reduction of duty on sacks from 12 to 8 per cent would not benefit the small scale sector as they would still continue to pay a duty of five per cent as before. According to it the woven sack industry in which more than 80 per cent was in the small scale sector should be brought within the scope of the small scale exemption scheme introduced by the government.

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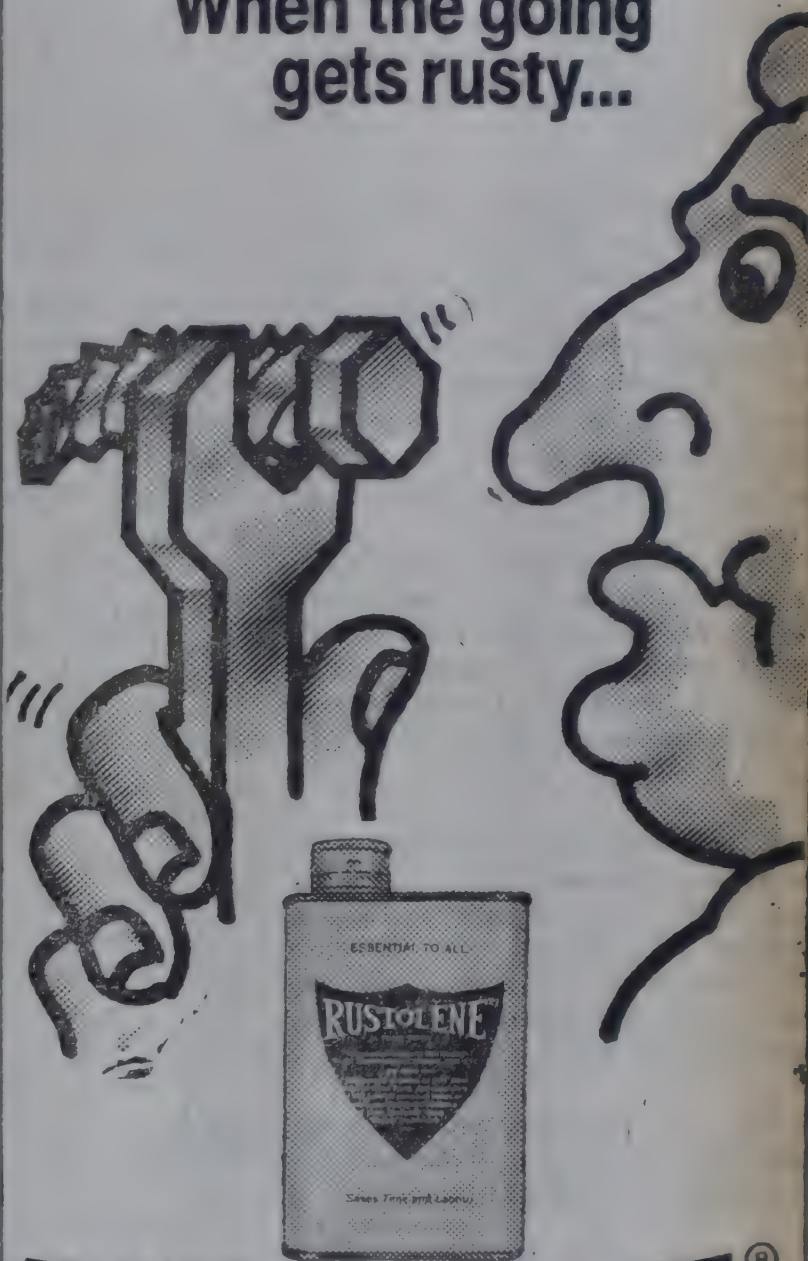
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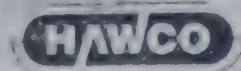
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Cartels a threat to plastic industry

The recent move by some of the European manufacturers of thermoplastics to form cartels, with a view to jack up the prices of their exports is likely to adversely hit the domestic plastic industry.

According to industry sources, as much as 50 per cent of the country's requirement of raw materials for plastic would have to be met through imports. Keeping this in view, some of the companies, including BASF of Germany and CDF Chemie of France had teamed up to push up the prices applicable to shipments to India.

This development came to the notice of the Indian delegation which visited several foreign countries recently in search of supplies. It lodged a complaint with the EEC and made requests to take necessary penal action against the companies.

As it is, the price of various thermoplastics like low density polyethylene (LDPE), high density polyethylene (HDPE), polypropylene (PP) and PVC, had gone up by more than 100 per cent in the international market during the past one year.

While in mid-1987, the prices ranged about \$ 600 per tonne, it had now gone up to about \$ 1,350.

According to Mr. M. L. Lahoti, President of the Indian Plastics Federa-

tion, while the current demand for LDPE was estimated at 1,80,000 tonnes per annum, the indigenous production was to the tune of 80,000 tonnes.

In the case of other raw materials like HDPE, the situation was even worse as the processors were more dependent on imported raw material, Mr. Lahoti added.

He also played the recent hike in the prices of indigenous LDPE effected recently by the Indian Petrochemical Corporation Ltd. (IPCL).

While the industry welcomed IPCL's efforts in distributing the imported raw material at a pooled and uniform price from both the sources, Mr. Lahoti urged the Government to scrap charges like commission paid to the State Trading Corporation (STC) and the excise duty and customs duty paid on account of pooling the prices of indigenous and imported raw materials.

According to the President, another reduction in the rate of customs duty could solve the problems of the domestic industry by making available the basic raw materials at reasonable prices.

He pointed out that despite heavy reduction in customs duty effected in September 1987, the Government's revenue collection on this account had increased to Rs. 700 crores against a budgeted customs duty revenue target of Rs. 585 crores.

FRESH LOOK AT IMPORT POLICY ASSURED: RUBBER

The Prime Minister, Mr. Rajiv Gandhi, agreed to examine the demand for modification in the new import policy relating to rubber and other cash crops.

This assurance was given when high level delegation of Kerala Congress met him and explained the hardships caused to the farmers by the new import policy.

The delegation consisted of Mr. K. M. Mani, leader of Kerala Congress Parliamentary party, Mr. T. M. Jacob, deputy leader of the Kerala Congress Parliamentary party, Mr. Thomas Kuthiravattom, MP and Mr. George Joseph Mundackal, MP.

Mr. Mani later told newsmen that the Prime Minister has agreed to take immediate steps to redress the genuine grievances of cultivators. As desired by the Prime Minister, the delegation gave him facts and figures about the damages caused by the policy.

Following the shifting of natural rubber from the canalised list to open general licence, its price declined from Rs. 17.40 to Rs. 16.85 a kg., the delegation said in the memorandum submitted to the Prime Minister.

Large scale import of bus and truck tyres will push down the prices of rubber in the domestic market hitting hard rubber cultivators, 80 per cent of whom are small holders. Out of an area of 3.8 lakh hectares of rubber plantation in the country, Kerala accounted for 3.4 lakh hectares.

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Workshop cum symposium on polymer aided reactions

University Grants Commission sponsored five-day Workshop (March 21-25, 1988) followed by a three day Symposium (March 26-28, 1988) was held in the Department of Chemistry, University of Jodhpur, Jodhpur. Since the development of the concept of using polymers as aids to bring about chemical transformations, by Dr. R. B. Merrifield (1963, Rockefeller University, New York, who was awarded Nobel Prize in 1986). Much research activity has been observed in the field of polymer aided reactions. Although several national and international symposia and conferences on this emerging, interdisciplinary subject have been held in many countries, this was the first programme of its kind to be held in India. The Programme was organised by Prof. N. K. Mathur Professor of the Chemistry Department University of Jodhpur, Jodhpur.

While the workshop provided training on the basic methodologies for polymer supported reactions, the symposium consisted of invited lectures and research papers from the specialists in the field from the universities and research institutions, throughout the country. Dr. F. Svec, of Macromolecular Institute, Prague (Czechoslovakia), also attended the academic and technical programme.

The main theme of the topics covered at the Workshop and symposia included.

- (i) Synthesis, functionalization and physico-chemical evaluation of polymeric material.
- (ii) Polymer aided sequential synthesis of biopolymers and general polymer aided reactions.
- (iii) Separation methods based on selective polymeric sorbents.
- (iv) Immobilised Catalysts and biocatalysts.
- (v) Instrumentation and automation in polymer aided technologies.

The participants of the symposium came from practically all the disciplin-

es of science and technology i.e. Chemistry, Physics, Biosciences, Medical and Agriculture sciences, and polymer science and technology.

A panel discussion about the national and international status of R&D and applications of functional polymers as speciality aids, was also held. It was decided to form an Indian Association of Functionalised Polymer Scientists. And Prof. V. N. Rajshekhara Pillai of Mahatma Gandhi University, Kottayam was nominated the first President of the adhoc working committee of the association. It was also suggested to hold more frequent and regular training programmes and conferences on this very important field of scientific endeavour. The next conference on the subject is likely to be held at the Chemistry Department Mahatma Gandhi University, Kottayam, Kerala, sometime during the year 1989.

ASSOCIATION OF POLYMER SCIENTISTS SET UP

In the panel discussion held during the U.G.C. sponsored "Workshop cum symposium (March 21-28, 1988) on Polymer Aided Reactions," it was proposed to establish INDIAN ASSOCIATION OF FUNCTIONALISED POLYMER SCIENTISTS. The activities of the association shall be to encourage R&D in the newly emerging interdisciplinary field of science and technology based on functionalised polymers, and to hold training programmes to help establishment of new centres of research and training and to hold symposium and conferences in this and related fields. A similar organisation at international level already exists.

Those who are interested in the activities of the association can contact (i) Professor N. K. Mathur Department of Chemistry University of Jodhpur, JODHPUR 342001. or (ii) Professor V. N. Rajshekhara Pillai, Head of Chemistry Department, Mahatma Gandhi University, Kottayam, 686001 Kerala.

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CIL saves Rs. 5 cr.

Coal India Ltd, has effected a saving of Rs. 4.78 crores through conservation of energy during 1987-88. The savings were effected as a result of steps initiated by CIL for efficient utilisation and optimisation of consumption of electric power and oil in coal mines.

The energy consumption quantified in terms of kwh per tonne of production declined substantially during the year as a result of the steps taken. Northern Coalfields Ltd., Western Coalfields and North-Eastern Coalfields exceeds the saving targets assigned to them while Central Coalfields Ltd, and South-Eastern Coalfields Ltd hit the targets. The reduction ranged from two to five per cent in kwh per tonne of coal produced as compared to the actual consumption during the preceding year.

The areas identified for energy conservation included: (1) amalgamation of consuming points and surrendering uneconomic points and supply, (2) improvement of power factor by installation of capacitor banks, (3) reduction in line losses, (4) staggering of mine pumping loads by enlarging sumps, (5) optimisation of ventilation loads, improved lighting system by using high lumen output luminaries, (6) reducing idle running of conveyor by providing surge bunkers, (7) providing energy meters on selected feeders controlling high capital power equipment, (8) changeover to electric equipment from diesel in opencast mines wherever possible (9) improved maintenance and timely overhaul of Hemm engines, and (10) strict vigil and audit on consumption of fuels.

To optimise utilisation of washery rejects, CIL has also placed orders for two sets of 2 x 10 mw fluidised bed combustion power stations after successful pilot plant trial. This will burn zero value fuel with calorific value content of 1900 to 2500 Kcal per kg and with ash content up to 70 per cent. Ten more such plants are being planned.

Energy conservation programme is being further intensified to bring about a general awareness among executi-

ves and employees through seminars and workshops. Efforts are also afoot to prepare energy audit manuals and to carry out energy audits and to suggest remedial measures.

UNDERGROUND MINING OF COAL: CDF OF FRANCE OFFERS SPECIALISED KNOWHOW

Charbonnages de France (CDF), the state sector coal company of France, which specialises in underground mining of coal from thick and steep seams is in the process of completing negotiation for the supply of longwall face equipment and providing blasting galleries methods to some coal mines in this country. M. Bernard Pache, chairman, CDF, who is now on a visit in Calcutta said that the application of French technology where mining conditions were difficult would result in higher raising of coal.

The new projects that CDF is negotiating in Calcutta include the Kottadills mines where two long wall faces are to be installed, the Parasea mine involving longwall mining with caving and development of Nandira and Ananta mines in Orissa. From what M. Pache said, it would appear that France is particularly aiming at that 25 per cent of Indian coal reserves where mining conditions are difficult.

In reply to a question, M. Pache agreed that France had to compete hard with the Soviet Union, Poland, West Germany and Great Britain to win contracts in the Indian coal sector. But since India had plans to increase the coal production target from the present 160 million tonnes to 400 million tonnes by the turn of the century, France was hopeful of participating in this area in a much bigger way in the coming years, he said, adding that CDF was helping Coal India Limited in introducing electronics in mining machinery equipment, CDF was helping in bringing about alliances between the French and Indian manufacturers. Presently, almost the entire range of machinery and equipment used in CDF projects in India is imported from France. He agreed that the availability of French line of cre-

dit made task of winning contracts for CDF easier.

Besides India, CDF has a strong presence in China, Australia, Canada and quite a few African and Latin American countries. M. Pache informed that in China, the CDF technology for thermal power was much in demand. He is hopeful of CDF participating in India's power development programme in the near future. In fact, CDF has already extended help to Hindalco, a Birla company, to improve the efficiency of its captive power plant at Renuagar in Uttar Pradesh.

Answering a question, M. Pache ruled out the possibility of the French government privatising CDF which employed over 35,000 people and which had a turnover of more than 13 billion Francs. He informed that the production of coal in France had declined from 24 million tonnes in 1977 to 15.4 million tonnes in 1987.

N. KARANAPURA TO EMERGE AS MAJOR COAL SUPPLIER

North Karanapura along with the newly developed Ashoka area under Central Coalfields Ltd is all set for emerging as the sole supplier of coal to the thermal power stations of Punjab, Haryana, Delhi and other States in a few years.

Announcing the next five years' working programme in the two areas, straddling Ranchi and Hazaribagh districts of Bihar, the CCL Chairman-cum-Managing Director, Mr. S. K. Chowdhury, said plans had already been evolved for a four-fold increase in the Karanapura coalfield's annual production to 25 million tonnes over the present level.

The coal reserves in North Karanapura area, which were estimated at more than 25 billion tonnes, are expected to last quite a long time, he said in an interview.

Mr. Chowdhury said the coal requirements of North India power stations were being met by the Singrauli Coalfields, but once the chain of super thermal plants went on full stream, the coal mines in this area would have hardly any spare production for supplying to power stations other than those located in and around the pit-heads.

Coal demand estimated at 202 m. tonnes

The Planning Commission has estimated the country's total coal demand at 202 million tonnes by 1988-89.

The Plan outlay for the coal sector has been fixed at Rs. 2,003 crores for the current financial year.

According to official documents the Commission had made downward revision of the requirement from the projected 208.55 million tonnes. It estimated that the coking coal requirement for the steel plants and coke ovens will reach 31 million tonnes.

The coal demand last year was 192.41 million tonnes.

The power sector will consume the highest quantity of non-coking coal totalling 104 million tonnes. The captive power plants of various industries would take a major share of another 36 million tonnes.

Among the individual industries cement sector will get a share of 11.60 million tonnes followed by the Railways with seven million tonnes.

The Department of Coal has prepared a production plan of 195.78 million tonnes to meet the demand.

Coal India Ltd. (CIL) is expected to contribute 170.08 million tonnes, Sin-

gareni Collieries Company Ltd. 20 million tonnes. The captive mines of the Tata Iron and Steel Company, Indian Iron and Steel Company and Damodar Valley Corporation would contribute another 5.70 million tonnes.

According to an official document, Coal India Ltd. will make an investment of Rs. 1,314 crores and Singareni Collieries Rs. 145 crores. Other companies in the mining and power sectors are expected to invest Rs. 535 crores.

The coal sector invested Rs. 1,044.15 crores till December last year.

Of the total coal demands, the Railways are expected to carry about 132 million tonnes while the rest will be moved by the merry-go-round road, rail cum-sea route and other convenient modes of transportation.

COAL RESERVES PUT AT OVER 170,460 m.t.

The country has a coal reserve of more than 170,460 million tonnes including proven strength of 49,376 million tonnes, according to an assessment of the Geological Survey of India.

The total reserve was calculated by GSI for coal seams of 0.5 metre and above in the thickness down to a depth of 1200 metres.

Bihar topped list with more than 57,570 million tonnes of coal. Orissa was a distant second with more than 32,662 million tonnes followed by West Bengal with about 30,022 million tonnes.

In all ten States have coal reserves. million tonnes Andhra Pradesh 10,435 million tonnes and Maharashtra 5,075 million tonnes.

The reserves in the north-eastern States of Assam, Meghalaya, Arunachal Pradesh and Nagaland are 280 million tonnes, about 459 million tonnes, 80 million tonnes and 12 million tonnes respectively.

The category-wise reserve of coal is calculated at about 50,000 million tonnes of proven and the rest is based on indicated and inferred quantity.

The report said that the Central Mine Planning and Design Institute continued detailed exploration programme during the last financial year for providing matching coal resources and the emphasis was on proving power grade coals and coal resources for the current and subsequent plans.

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GOVT APPROVES DADRI PROJECT:

Power sector to get gas

The Union government has approved, in principle, the use of gas by the power sector. It has accordingly cleared the proposal to set up a gas based power plant at Dadri. In addition gas will now be available for the Delhi Electricity Supply Undertaking (DESU), Indian Explosives, Faridabad, Noida and Gaziabad.

The decision to this effect was taken by the Cabinet recently. Accordingly, the Gas Authority of India Ltd (GAIL) will now lay a spur line from Bobral in UP to Faridabad, Gaziabad, Dadri and Delhi for providing HBJ gas to these users, estimated to cost Rs. 100 crores.

Incidentally, the government has also set up a committee under the Planning Commission to examine how best to utilise the surplus gas that will be available even after the alternative consumers like DESU and others have been fed. The committee will also examine various aspects of marketing the surplus gas.

It is interesting to note that the Gail had been urging the government to take a quick decision on the utilisation of surplus gas as some of the fertiliser plants, originally envisaged along the HBJ pipeline route, had been delayed. Gail was losing substantial sums because of this delay especially,

as its work on the 1700-km pipeline was progressing as per schedule.

The fertiliser plants were envisaged as the original and only consumers of HBJ gas when the pipeline was thought of. On an average, the daily consumption of a fertiliser plant, along the HBJ route, was worked out at 1.7 million cubic metres.

It is estimated that the spur line to Delhi and its neighbouring areas will enable Gail to supply about five million cubic metres of gas to users in these areas every day worth over Rs. 1 crore.

Among other things the approval to supply gas to the Dadri power plant will prove a boon to power starved Delhi and its neighbouring areas. Even though the decision to set up a gas-based power plant at Dadri (600 mw) had been taken some time ago (in addition to a thermal plant at the same place), actual clearance has been received only now.

Another interesting aspect is that Gail will now be able to supply gas to many Industrial units in Faridabad, Gaziabad and Noida who will now become its consumers. This additional source of consumption will also enable Gail to reduce its losses (which it was facing because of the failure of

some of the committed consumers to come up along the HBJ route on time).

Meanwhile, it is learnt that Gail has already begun exercise to build the spur line to Delhi and neighbouring areas. Exercises are afoot to float tenders for the job. If everything goes well, it is expected that by March 1989, Delhi and its neighbouring areas will get gas.

To utilise the excess gas Gail first began working on a spur from Vagodia to IPCL in Baroda. The 32km spur line was thought of because it was felt that the excess gas could easily be fed to IPCL, a consumer who was not originally on the list.

Incidentally, the spur line to IPCL will help Gail sell about 1.2 million cubic metres of gas a day valued at Rs. 26 lakhs. In other words, Gail will earn an estimated Rs. 6 crores a month from its supplies to alternative users in the area following the construction of the spur line.

Gail was able to start work on the spur line quickly as it has the power to take up projects costing Rs. 20 crores less, on its own. The Vagodia spur line is expected to cost Rs. 7 crores.

A heartening feature is that the spur line is being put up by Gail itself and not in collaboration with the consortium of Spie Capag of France and Toyo Engineering and NNK of Japan, who are building the HBJ.

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REFINERIES USING IMPORTED CRUDE:

Storage facilities to be expanded

The Union government has made it mandatory for all coastal refineries as well as those refineries using imported crude to create special storage facility to meet any exigencies in the availability of imported crude following disturbances in West Asia.

Giving this information in Calcutta recently, Mr. S. N. Sarkar, chief general manager of Indian Oil Corporation's Haldia refinery, told newsmen that four mandatory crude oil storage tanks of 60,000 capacity each had already been installed at Haldia refinery at an additional cost of about Rs. 15 crores. The new storage arrangement, he said would take care of about 45 days' crude requirement of the refinery against 25 days' under the erstwhile storage arrangement.

For Haldia refinery, he felt, such an arrangement was particularly necessary because the refinery was so designed that it depended solely on sup-

plies from West Asia. For example in 1987-88 the refinery processed as many as six types of crude such as Basrah light (Iraq), Arabmix (Saudi Arabia), Kirkuk (Iraq), Iran light (Iran), Kuwait (Kuwait) and upper Zakum (Abu Dhabi).

Of these, the first three varieties were most suited for processing purpose. Accordingly, out of the total throughput of about 2.8 million tonnes of crude to the refinery in 1987-88, Basrah light accounted for 2.15 million tonnes or over 76 per cent, Kirkuk, 3.79 per cent and Arab mix, about 2.6 per cent.

In other words, these three types together accounted for more than 83 per cent of the throughput. Iranian light accounted for about 4.54 per cent, Kuwait-crude, about 11.26 per cent and upper Zakum, less than one per cent.

To a question, Mr. Sarkar said, though the Haldia refinery was originally designed for Aghazari crude, was now being forced to use other varieties because of non-availability of Aghazari crude. At one point, the refinery had to process as many as 10 varieties with the result the yield pattern did not conform to desired specifications.

As for the prospect of crude supplies in 1988-89, he felt that there should not be much of a problem as the government had already done the necessary tie-ups. He however pointed out that the throughput to the refinery in the current year might be around 2.65 million to 2.7 million tonnes against over 2.8 million tonnes in 1987-88. This was because the refinery was currently undergoing statutory shutdown for one month.

Mr. Sarkar pointed out that Haldia refinery achieved more than 100 per cent capacity utilisation for the third consecutive year. At 2.8 million tonnes of throughput, the refinery achieved 112.3 per cent in 1987-88 against 104.9 per cent in 1986-87. He attributed this to better maintenance, improved operational practices and constant upgradation of technology. All these measures, he said, had also helped achieve for the first time 3.3 million accident-free man-hours.

Pending the clearance of the expansion of the refinery, a proposal that has been lying with the government for many years, the management of the refinery is trying its best to improve the capacity utilisation through debottlenecking and other operations. These measures, he felt, should help the refinery to achieve throughput of about three million tonnes against the designed capacity of 2.5 million tonnes. About Rs. 7 crores were spent so far for this.

The major on-going projects taken up at Haldia refinery at a cost of Rs. 20.84 crores include installation of air pre-heaters to increase furnace efficiency in crude distillation unit, heavy naphtha projects to augment production of middle distillates like HSD and kerosene, low-cost revamping of solvent and dewaxing unit, increase production of lube oil base stock and expansion of tank wagon to tank truck loading gantries.



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While the installation of air pre-heaters is expected to result in an annual fuel oil saving of 8.650 tonnes, revamping of solvent dewaxing unit to be completed at a cost of Rs. 35 crores will yield additionally 1000 tonnes of lube oil base stock annually.

Some of the projects which are awaiting approvals of the government involving a total outlay of Rs. 28 crores will include seven additional product tankages and pipeline facilities, tankers for loading and unloading crude and petroleum products at proposed second oil jetty.

Haldia refinery is one of the three refineries in the country to produce various grades of lube oil base stocks, production of which in 1987-88 150.3 thousand tonnes was highest ever. A major breakthrough was also achieved in the production of other products like HSD, 857,6000 tonnes, kerosene, 187,1000 tonnes and carbon black feed stock, 63,2000 tonnes. Gas filling of about 1.85 million cylinders was highest ever achieved in a year.

HALDIA REFINERY OUTPUT MAY GO UP

The Indian Oil Corporation's Haldia refinery capacity is likely to go up to 3.1 million tonnes on the completion of the measures initiated to remove some of the bottlenecks in its operations.

Disclosing this to newsmen in Calcutta on April 29, Mr. S. N. Sarkar, Chief General Manager of the refinery, said that Rs. 7 crores had been spent over the last three years to modify some of the processes besides the Rs. 10 lakhs spent during the current year. Dwelling on the performance of the refinery, Mr. Sarkar said that the unit had processed 2.80 million tonnes of crude oil during the year 1987-88 as against 2.62 million tonnes in the previous year.

This marked a capacity utilisation of 112.3 per cent compared to 104.3 per cent during the last year. The major projects completed during the previous year, at a cost of Rs. 3.02 crores included modernisation of the effluent treatment plant, installation of sophisticated automatic

sprinkler systems at the LPG bottling plant and augmenting bitumen production.

Referring to energy conservation, Mr. Sarkar informed that with the result of the installation of an air pre-heater, an annual fuel savings of about Rs. 2 crores, would be achieved.

Moreover as part of a project undertaken in all the coastal refineries, four mandatory crude oil storage tanks of 60,000 cubic metres capacity have been installed at a cost of Rs. 14.88 crores to take care of any exigencies in the receipt of imported crude, Mr. Sarkar informed.

NEW NORMS ON APPLICATION FEES: EOUs

The Union Government had decided that applications for grant of permission letters under the 100 per cent export oriented units will also have to be accompanied by a demand draft for Rs. 1,000 per application, drawn in favour of P and A.O., Department of Industrial Development.

This has been done to bring about uniformity in fees to be paid for permission letters for all types of industrial undertakings. A press note, issued by the Industry Ministry, gives the new procedures immediate effect.

It will be noted that under the scheme of 100 per cent export oriented units (EOU), industrial licences are granted in respect of items covered by the first schedule of the IDR Act. However, in case where the proposed item of manufacture does not fall within the above-mentioned provisions, permission letters are issued to such industrial undertakings.

Applications for grant of industrial licences will continue to be required to be submitted with a demand draft of Rs. 500 drawn in favour of the P and A.O. Department of industrial development. Similarly, applications for registration with the Directorate General of Technical Development and Secretariat for Industrial Approvals (SIA) are required to be submitted with a demand draft for Rs. 1,000, the press note adds.

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Gas holds promise

Natural gas holds an excellent promise as alternative to oil and the recent discoveries of gas, particularly in the giant south Bassein gas field in the western offshore have enhanced hopes further. India's gas reserves have increased five fold during the last 10 years. The present level of gas reserve is of the order of 1005 billion cubic metres and is expected to go upto 1231 billion cubic metres.

This confidence in the emerging source of energy, the natural gas, was expressed by Col. S.P. Wahi, chairman, Oil and Natural Gas Commission, while talking to newsmen.

He said, unfortunately, our entire system, that is the industry, planners and consumers have not geared themselves up for use of this resource. The government should come forward with some subsidy schemes and exert the automobile manufacturing companies to change the design so that gas could replace the use of petrol or diesel. Similarly, consumers too needed to be educated on the matter.

Col Wahi said that gas is cleaner and can replace kerosene in the do-

mestic sector, naphthalin the fertiliser sector, and fuel oil, LSHS and HSD, in the power sector. In the transport sector it can replace the alarmingly growing demand of middle distillates like HSD and petrol.

Col Wahi pointed out that the ONGC has been responsible for supply of gas to multifarious industries like, fertiliser, ceramics, glass, textile, paper, petrochemicals, electronic and heavy water project in Gujarat. In Assam, the gas supplies are being made to tea estates, fertiliser plants and for power generations. The proper utilisation of gas would save the foreign exchange to the tune of Rs. 2000 crores by 1990-91. The significance of this could be understood by the fact during 1986-87, the country spent a sum of Rs. 2216 crores in foreign exchange for import of crude.

The prognosticated resources of Indian sedimentary basins are estimated to be 17 billion tonnes of oil and oil equivalent of gas of which approximately more than 60 per cent is in offshore.

Bombay high structure was mapped by seismic surveys conducted in West coast offshore during 1965. It was in 1974, when the first offshore well drilled by Sagar Samrat struck. This encouraging discovery was followed by intensive drilling and exploration in and around Bombay High. Commercial oil production from India's first offshore oilfield commenced on May 21st, 1976. Further exploration lead to discoveries of other offshore oilfields nearby like Heera, Ratna, Panna and gas fields like Bassein, South Tapti. Production on Heera started in March 1984, Ratna in November, 1982 and Panna in 1986. Production from Bombay high and neighbouring offshore field rose to 5,00,000 barrels per day in 1987.

In 1987-88 ONGC produced 27 million tonnes of oil, 2016 MMT from Western offshore fields. Gas sales rose to over 5.8 billion cubic metres, of which 4.9 billion cubic metres was from the onshore terminal. Uran connected to the offshore process platforms by sub-sea pipeline. Gas is supplied to consumers from onshore terminals at Hazira and Uran. In addition 4,62,530 MT of LPG and 2,50,272 MT of NGL were produced from the Hazira and Uran plants.

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SPOTLIGHT ON

Biotechnology & Life Sciences (Part 1)

NEW PRODUCTS WILL FUEL BIOTECH GROWTH IN 1988 IN U.S.A.

Healthy gains are expected in sales of biotechnology derived products during the next few years. Consulting Resources (Lexington, Mass.) estimates that the market for biotechnology products should reach about \$650 million this year, up 41% from estimated 1987 sales of \$460 million. One important new product approved last year, Genentech's (South San Francisco, Calif.) *Activase*, Tissue Plasminogen Activator, could account for \$50 million in sales in 1988. It is also estimated that total sales of human therapeutic products could reach about \$250 million up from \$170 million.

A key product that should be on the market by 1990 and is currently awaiting FDA approval is erythropoietin (EPO), which helps grow red blood cells. That product should contribute about \$60 million in sales by 1992 according to Technology Management Group (New Haven, Conn.) a consulting firm. The consulting firm feels that EPO has 'tremendous potential' because of the shortage of the human blood supplies and concern over contracting infectious diseases from donated blood. The first EPO on the market could be from Amgen — (Thousand Oaks, Calif.) which is awaiting FDA approval. (*Chem Wk.*, Jan. 6-13, 1988, p. 46)

A NEW ROUTE (VIA MICROORGANISM) TO VITAMIN B2

A new biotech route to Vit B2

(Riboflavin) is on the horizon. By the end of April 1988, Coors Biotech Products expects to begin commercial production of riboflavin at its Winchester, Kentucky, U.S.A. plant, using a microorganism developed by Synergen (Boulder, Colo, U.S.A.). The vitamin produced will be for both pharmaceutical and good use.

Synergen researchers applied the proprietary technique of genetic strain improvement to increase rates of riboflavin production significantly over those of existing processes.

Coors Biotech developed the fermentation and scale-up techniques and will be responsible for production and marketing activities. Separately, Synergen and Coors are nearing completion of a second project: the development of a natural food-colouring agent, which the companies expect to start producing in mid-1988. (*Chem. Wk.*, Jan. 6-13, 1988, p. 58)

A NOVEL ENZYME-BASED ANTIOXIDANT ON THE HORIZON

Antioxidants are agents which fight the presence of oxygen. Oxygen is essential for life but under wrong circumstances it can be a real trouble maker. It causes corrosion, it diminishes flavour, and shelf-life of most foods. It kills anaerobes — an important group of bacteria — that are significant clinically because they cause such infections as gangrene and tetanus. They also are important industrially because they produce compounds like hydrogen, methane, ethanol, butanol and acetone.

Research at Oxyrase (Ashland, Ohio) has recently unveiled a novel

type of antioxidant based on enzyme action. It is expected to be a safe, longer-lasting oxygen fighter. Oxyrase has made its new antioxidants from the cytoplasmic membrane of *E. coli*. The membrane catalytically removes oxygen from a system because it contains a series of respiratory enzymes called the cytochrome system. These enzymes transfer hydrogen atoms from hydrogen donors, generally found in such microbiological media as lactic acid and succinic acid to oxygen. In this way they produce water.

The membrane particles, which are about 0.2 micron in size — are stable as a frozen suspension for at least a year. Their peak activity occurs at 55°C and at a pH of 8.4. In microbiological media, addition of 10-20 microlitres of the particles to each millilitre of media produces anaerobic conditions: Oxygen is removed completely within five minutes. Antioxidant activity is retained for at least one week at 37°C in both liquid and solid media.

Because the particles are too big to penetrate bacterial cells, they are not toxic to bacteria. That is considerably different from current microbiological techniques to produce anaerobic conditions, which often use strong chemical reducing agents like thioglycolate. Such agents are often toxic because they penetrate the bacteria and react with important cell components.

Oxyrase researchers have used the antioxidant particles to grow 18 species of anaerobes from eight genera. Most of these anaerobes were grown without oxygen-free containers or special precautions for

excluding oxygen during media preparation. Further, the anaerobes generally grew faster and to a higher cell density than they did with conventional anaerobic technology.

The researchers believe that the product will have a big impact on the \$12 million/year anaerobic microbiological market in the U.S.A. alone. That market is made up of research laboratories that deal with anaerobes and clinical laboratories that identify the organisms. Currently Oxyrase is test marketing its product in research laboratories. It will sell the antioxidant at about \$5/litre of microbiological medium. The company is now producing the product on a pilot plant scale. Industrial scale production could reduce this price by 100-fold — making the product far cheaper vis-a-vis the chemical antioxidants now in use.

The company has high hopes for the new antioxidant as a food preservative. In fact, it is evaluating the product for a future joint venture in that direction with the biotech division of Universal Foods, known as Universal Bio-Ventures. Universal Food would bring to the venture its biotech experience in scale-up and marketing. Moreover, both companies believe that the FDA approval of the product would be forthcoming, because the antioxidant can be made from the cytoplasmic membranes of any aerobic microorganism, including organisms like yeast that already have been approved as food additives by FDA.

Applied DNA Systems (New York City) also is high on Oxyrase's antioxidant. Applied DNA Systems now own 8% of Oxyrase and has option to purchase another 14.7% of the company.

Applied DNA sees a host of industrial, environmental and pharmaceutical applications for the

antioxidant:

- * For removal of corrosion-causing oxygen from cooling water in power plants. The Oxyrase antioxidant could bring oxygen down to the p.p.b. level. Further, to make the antioxidant heat-tolerant, it could be derived from a high-temperature microorganism and placed in a low-temperature portion of the cooling loop.
- * As an antioxidant in the anaerobic cycle of sewage treatment. Using the antioxidant would increase the rate of anaerobic digestion, thereby increasing throughput and cost effectiveness.
- * For improving the efficiency of the fermentation of anaerobic microorganisms that pharmaceutical companies use to produce antibiotics.

Researchers are excited about the future possibilities via r-DNA technique. For instance, genetic engineering techniques developed for aerobes may become, with some modification, applicable to anaerobes. So far, Oxyrase researchers have been able to transfer a gene that controls resistance to the antibiotic streptomycin from the aerobe *B. subtilis* to the anaerobe *Clostridium butyricum*. They also have selected, with high sensitivity, mutants that are resistant to butanol. That is important, because it is believed that the fermentation efficiency of *C. acetobutylicum* is inhibited by the butanol it produces. (*Chem. Wk.*, Jan. 6-13, 1988, p. 59)

JAPAN AND U.S.A. JOIN TO SEQUENCE HUMAN GENOME

Sequencing the human genome is a project that has taken on worldwide scope in recent years. The reason: The potential benefits are

many, including the determination of the genetic basis for as many as 3,500 diseases caused by genetic mutation and, moreover, possible ways to correct those diseases. Now the U.S.A. and Japan have joined force in that project.

Washington University (St. Louis, Missouri) and the Institute of Physical & Chemical Research (Riken) in Tsukuba (Japan) have entered into a three year agreement that will use the Washington University's genetic technique of cloning human-DNA in yeast cells and the Japanese Riken's sequencing technology which employs some of the most extensive gene analyzing equipment in the world. Research will focus initially on determining the DNA sequence of an entire yeast chromosome. Further efforts will focus on the American University's cloning technique that allows researchers to grow yeast cells containing intact specific fragments of human DNA. (*Chem Wk.*, 12/23/87, p. 28)

GENENTECH RECEIVES KEY BIOTECH PATENT

A broad patent on techniques basic to commercial biotechnology has been issued to Genentech Inc. Interpreted broadly, the patent could cover most systems used to manufacture the products of biotechnology. Genentech thus stands to collect royalties on many products sold by its competitors.

The patent was filed in 1979. The research leading to the patent was conducted at Genentech — and under the company's sponsorship at the University of California, San Francisco and the city of Hope National Medical Centre, Duarte, California. The patent names as co-inventors, Keichi Itakura and Arthur Riggs of City of Hope.

The U.S. Patent 4,704, 362, which

as already been issued in 20 other countries, is being described as the industrial equivalent of the Cohen-Boyer patent held by Stanford University and University of California. The Cohen-Boyer patent covers the production and use of plasmids as carriers for moving genes between organisms, one of the basic techniques of genetic engineering. The new Genentech patent covers techniques for actually transplanting a plasmid containing a heterofenous gene into a microbial host and getting that host to express the protein encoded by the new gene. Such transformed microbes are then cloned and grown in fermentation tanks where they act as factories for producing the desired protein.

Because of litigation over the patent in other countries and because licensing agreements need to be worked out with competitors, Genentech is being circumspect in discussing the implications of the patent. The patent specifically addresses moving genes into bacterial and yeast cells, which were the first type of cells to be genetically engineered. Although bacterial and yeast cell cultures remain important in commercial biotechnology, many of the newer products of biotechnology are produced in mammalian cell cultures. It is not clear whether Genentech's patent will apply to mammalian cell cultures.

According to the statement released by the chief executive of Genentech, the company will not use the patent to block other companies from using the techniques, but rather will offer nonexclusive licenses to other biotech companies 'at reasonable rates on a case by case basis'. (*C & EN.*, 11/9/87, p. 5)

SYNTHETIC DNA-CUTTERS ON THE HORIZON

American genetic engineers have

made the first of what will be a family of cutters to enable researchers to cut DNA anywhere they wish. The cutters currently used are enzymes which can only cut DNA at a few points.

Generally, genetic engineers cut up the DNA double helix at specific sites. The genes and other sections of DNA of interest to genetic engineers must often be cut out of large segments of natural DNA, such as entire chromosomes. This cutting job is largely done by various naturally occurring enzymes (restriction enzymes).

Enzymes that cut DNA bind very selectively to a specific sequence of the nucleotides of which any DNA molecule is composed. Their chemical groups belonging to the enzyme break the DNA chain wherever the enzyme has become bound. These enzymes are very large complex molecules.

Peter Dervan and his colleagues at Celltech have made a synthetic DNA cutter that is much smaller and simpler than enzymes. Dervan's group examined the structure of an enzyme *Hin* recombinase which binds to a specific sequence of nucleotides in DNA. The enzyme is not a DNA cutter. They identified the region of the protein chain responsible for binding to DNA. They then duplicated the DNA-binding fragment of the enzyme using the appropriate amino acids and linked it to a synthetic peptide (small protein). They then attached to this fragment the simple chemical group 'ethylene-diamine tetracetic acid' (EDTA) which they knew would react with any DNA it came into contact with and cut it, provided various other chemicals (iron ions, oxygen and a reducing agent) were added to the reaction solution.

In this way they generated a syn-

thetic DNA-cutter from a protein that binds onto DNA but does not cut it.

Similar DNA-cutters could be made from many other proteins which bind to DNA, all in different places but do not cut it. If genetic engineers succeed in manufacturing new types of binding peptides, they may eventually be able to cut DNA wherever they want. Such DNA-cutters are likely to be more stable than most enzymes, and will in many cases be easier and cheaper to produce.

Dervan group has also linked the DNA-cutting EDTA group to short single strands of synthetic DNA which will bind to specific regions of DNA to form an unusual triple helix structure and then cut the target DNA.

Any strand of DNA is able to bind to another DNA strand composed of a complementary sequence of nucleotides forming a double helix. Similarly, three strands, one complementary to the other two, can in some circumstances combine into a triple helix. (*Science Vol.*, 238, p. 645)

A NEW DETERGENT LIPASE ENZYME FOR DISSOLVING FATS UNVEILED BY NOVO INDUSTRY

A new detergent enzyme that dissolves fats has been recently unveiled by Novo Industri (Bagsvaerd, Denmark). The enzyme *Lipolase lipase*, which Novo reports is the first genetically engineered enzyme to be produced on an industrial scale. It dissolves fatty stains on clothes caused by cosmetics, gravy, edible oils and body grease.

Current detergent enzymes in use are proteases that work on protein stains like egg and blood, as well as amylases that dissolve such starch-containing stains as cocoa and

gravy. Detergent enzymes save energy by allowing the washing of clothes at low temperatures, ranging from 15 to 60°C. (*Chem Wk.*, 2/10/88, p. 20)

ELECTROPHORESIS HELPS BIOTECH RESEARCH IN POLYPEPTIDE PRODUCTS

Growth in biotechnology has created new kinds of problems for analysis of biopolymers. Increased interest in peptides and proteins as pharmaceuticals is spurring interest in electrophoretic methods for monitoring yields, purity, stability and consistency of polypeptide products.

Proposals for sequencing the human genome demand greater time and cost efficiency in all aspects of the sequencing process, including electrophoresis. For these new problems, automation, speed, accuracy and reproducibility are of increased importance. Although instrumental systems for electrophoresis have been described, none have come into widespread use, principally because of their complexity.

In the past few years there has been renewed interest in instrumental electrophoresis. Progress is being made in the development of automated systems for DNA sequencing (*Science* 235 (part II), G89, 1987). This includes techniques (*Science* 238, 336, 1987) for fluorescent labelling and on-line detection, use of prefabricated gels, and use of computers to aid in data interpretation. Fully instrumental electrophoresis based on separations carried on capillary tubes is another development that is gaining serious attention (*Science* 222, 266, 1983). This approach is readily adaptable to autosamplers, on-line detection, computer based data acquisition, automated fraction collection and direct interfacing to subsequent analytical techniques such

as mass spectrometry (*Anal Chem* 59, 1230, 1987). During 1988, researchers and analysts are expecting to see the introduction of the first commercial equipment for capillary electrophoresis. (*Science*, 2/12/88, pg., 82)

WOUND HEALING A NEW PROMISING FIELD FOR BIOTECHNOLOGY

Modern medicine has not yet devised any widely accepted treatment that actively promotes the healing of wounds. Some of the substances, collectively called growth factors have been known for many years and more are being discovered. They are polypeptides secreted by certain cells. Most of the published research work on tissue-regenerating properties of growth factors consists of invitro tests or work on the eye, where growth factor treatment may be particularly valuable because the cornea lacks a blood supply.

Researchers at Washington University Medical Centre (St. Louis) have recently found that the factor called transforming growth factor (TGF-B) is a potent pharmacologic agent that can accelerate wound healing in rats. Researchers found that when human TGF-B extracted from blood platelets was applied in a slow release suspension to standard incision in the skin of rats, it speeded healing by about 3 to 5 days after wounding. Further, incisions treated with TGF-B were more than twice as strong as those receiving no TGF-B. The compound hastened the deposition of collagen, a fibrous protein. It is, therefore, reasonable to infer some similar effect in humans.

The above research work was carried out in collaboration with Amgen Inc., a biotech company of U.S.A. This company has drained

\$40 million for extensive research on clinical testing of tissue, regeneration compounds in animals and humans. If effective, preparations incorporating growth factors can be developed in future, they could be particularly valuable in the treatment of severe burns, skin graft donor sites and injuries to the cornea. Surgeons may in the future also use sutures impregnated with growth factors.

Another company, Chiron Corporation (Emeryville, California) has a product incorporating epidermal growth factor (already in human clinical trials). More than a third of eye-injury patients treated with the product show complete healing.

Bedsore and diabetic ulcers, which are hard to treat, might also be healed in future successfully with synthetic man-made growth factors. The stakes are high. The annual market for wound treatment products can be estimated in several billions worth in dollars worldwide. (*Sci. American*, 11/1987, pp. 17-18).

BASF EXPANDS VITAMIN CAPACITY

BASF will expand its vitamin production with the construction of two new plants at Ludwigshafen worth more than DM100m (\$59.5m). Both plants will use BASF technology. The West German chemical major will move into production of Vitamin B3 (riboflavin) for the first time with a new 5,000 ton/year unit, which it says will close the gap in its production palette for animal feed additives. This plant is scheduled to go on stream at the beginning of 1990. A second plant for which BASF has not revealed capacities will double the group's production facilities for Vitamin B2 (nicotinic acid). The plant set for commissioning in mid 1989 will use a fermentation process described by BASF as "economical".

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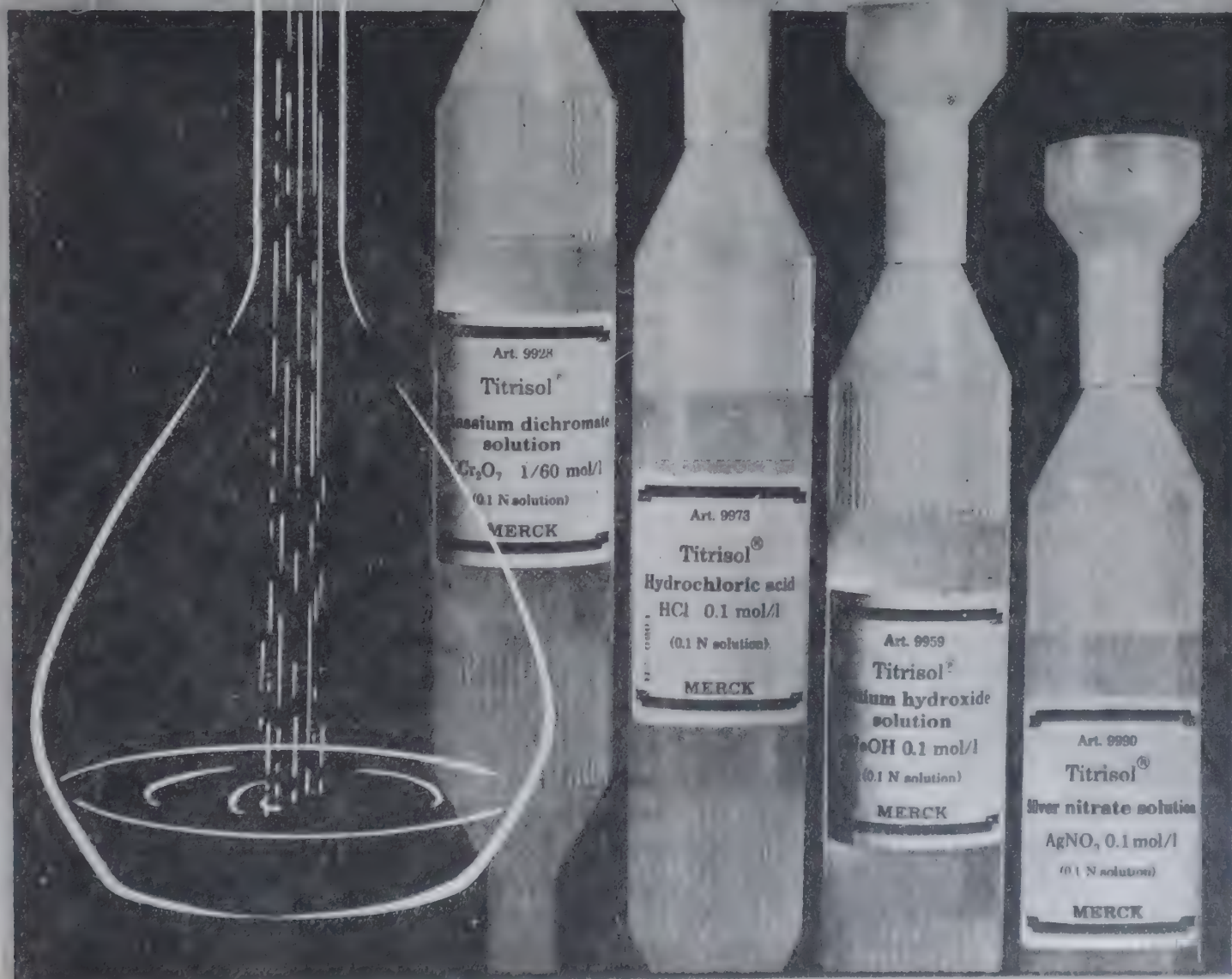
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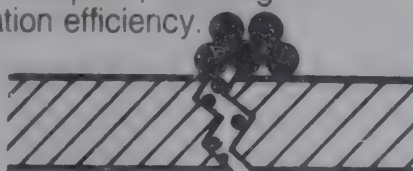
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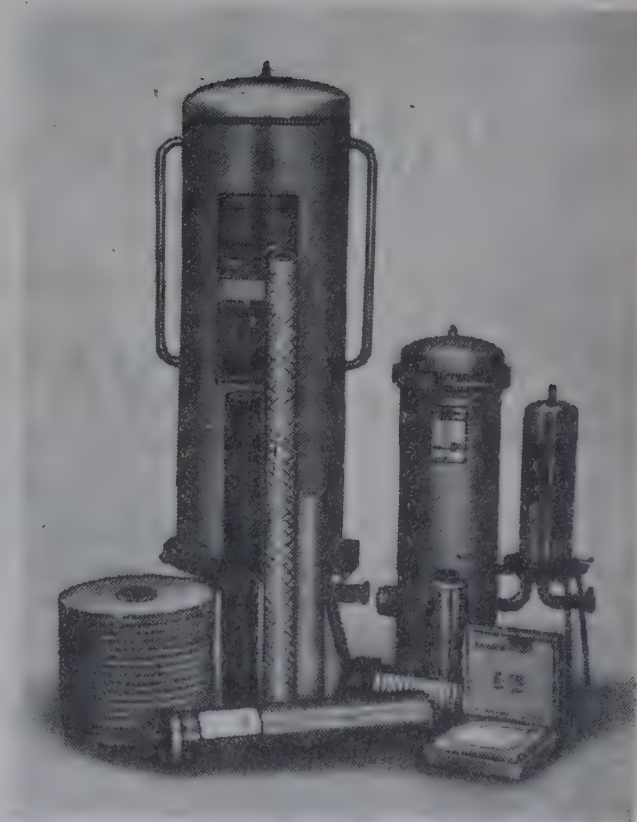


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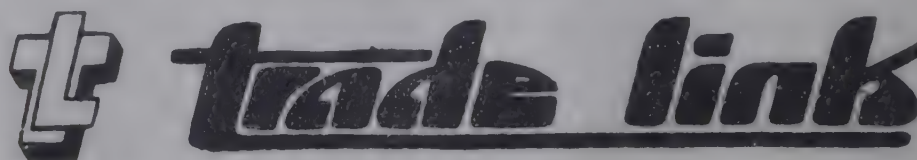
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Some Thoughts on Environment*

As an environmental scientist, I deal herewith the distortion and exaggeration of environmental hazards in the U.S. by EPA and its satellite organizations; some of which are not without very unsavoury connections.

More Heat than Light

This is a subject on which there is far more politics than science in the world today in accordance with the lack of proper application of knowledge and the second law of thermodynamics, far more heat than light. Unfortunately, the developing world looks to the U.S. Environmental Protection Agency as a source of knowledge, and it is not. In the U.S., environmental legislation has supplanted knowledge. A second problem stems from the concept that cancer, admittedly an unpleasant way to go, is largely environmentally caused: the facts show that hereditary factors are by far the most important contributor. Consequently, EPA reasons, if "chromium" was found to cause inordinate amounts of lung cancer among workers in the industry 40 years ago, it then must follow that even miniscule exposure to any chromium compound in any way must pose a risk to be legislated against.

Chromates & Lung Cancer

The facts, as far as lung cancer is concerned, are these:

Studies in the Mutual Baltimore plant before World War II by the U.S. Public Health Service, confirmed the fact that chromate workers were at substantially higher risk of lung cancer than the general population of Baltimore. As a responsible corporation, Mutual began to plan for a plant engineered to remove hazards from the workplace instead of relying on respirators, etc., which men working under severe conditions simply will not wear. I personally measured dust levels in the plant at this time and found them generally from 1.0 to 4.0 mg/m³. The average work week was 42 hours, so the relative exposure was 42 to 168/plant employee. At the time of World War II, wartime priorities sharply increased the work week to 80 hr., while reduced maintenance

caused dust concentrations to increase to 4.0 to 10.0 mg. CrO₃/m³, giving a relative exposure of 320 to 800.

Bad as these statistics are, they do not tell the whole story. There is little doubt that time away from work is of importance in clearing the lungs of harmful particulates. Hence the relative intensity of exposure is best given by:

$$I = \frac{W \times C}{168 - W}$$

where W = work week in hours and C dust concentration. Taking average values for C, we have:

	W	C	I
Pre-War, o	42	2.5	0.833
War years, w	80	7.0	6.364
			$\frac{Iw}{Io} = 7.64$

With these massive exposures, and the known time of development of lung cancer generally, it was not surprising that the lung cancer experience took a significant turn for the worse during the 1950's and 1960's. Virtually no one who worked full-time in the old Mutual plant during the war years survived the experience by 20 years. I might remark parenthetically that I am not insensitive. These were my friends and co-workers; they are just as surely the victims of war as if they had been killed at Omaha Beach or Guadal Canal.

The Diamond plant at Painesville, Ohio suffered the same experience, and it was this operation which came under government scrutiny after the war. The extremely high cancer rates, in the eyes of environmental regulators, gave good evidence that chromates (and presumably chromium compounds generally) are dangerous carcinogens.

In the meantime, Mutual built a new plant at Baltimore, sparing no expense to control dust and mist concentration. The plant went into operation in 1950-51, and the old plants at Baltimore and Jersey City were demolished. After a few trouble spots were eliminated, dust concentrations were found to be in the range of 0.04 - 1.0 mg/m³, while the work week returned to 42 hours. The value of I is now 0.233, and it would be expected that a significant improvement in the cancer experience would be realized. However, the long incubation period of lung cancer precluded such an epidemiological study until the late 1970's.

This represents the personal opinion of Winslow H. Hartford, Ph.D., Professor Emeritus, Environmental Science, Belmont Abbey College, Belmont, NC, 28012, USA. Dr. Hartford was recently in India on an IESC assignment with Golden Chemicals Pvt. Ltd., Bombay. This text has been provided to us by Dr. O.P. Kharbanda, who has also kindly edited it for us.

At that time, the cancer experience of men who had worked in the new plant, but never worked in the old plant was slightly better than that of the male population of Baltimore. However, such uncontrollable factors as sample size, transience of the post-war labour force, and smoking made a statistical appraisal impossible, and conservative statistics level to a "not proven" verdict. (See the work of Hayes and Lilienfield, as reported in a Johns Hopkins University thesis, and an article in *Int. J. Epidemiol.* (1979) 8:365-74). I am personally convinced that a well-engineered plant, even using limestone or dolomite in roasting can be perfectly safe. The dust levels in the roast-leach area at Mersin, for instance, are in the order of 0.02 mg/m³.

All Chromates Carcinogenic?

There is now the question: Are all chromates carcinogenic? This question must be answered by animal experimentation. For many years, Dr. Anna Baetjev at Johns Hopkins tried unsuccessfully to initiate cancer by various techniques. More recently, improved surgical techniques have made it possible to implant suspected carcinogens directly in the lung of the test animal and it is found that calcium, zinc, strontium, chromic and lead chromates, as well as lime roast dusts give positive response; whereas soluble chromates, such as sodium and potassium chromate/dichromate are not carcinogenic. Hartford (paper in Golden files) has suggested that the culprit may well be Cr⁵⁺, which is known to be an intermediate in the reduction of chromate by organic materials and whose stereochemistry mimics that of P⁵⁺, whose importance in cell replication is well known.

Hence, one route to the elimination of lung cancer, apart from the engineering approach taken by Mutual in 1950 and Mersin in 1983, is to eliminate calcium chromate or Ca₃(CrO₄)₂ from the process. Fragmentary evidence that this was a route was available from the operation of a small U.S. plant at Glens Falls, N.Y. and from British initial operation prior to World War II.

As a result, both the Diamond plant at Castle Hayne (1970) and the American Chrome plant at Corpus Christi (1983) used low- or no-lime processing to eliminate calcium-chromium compounds, as well as to make continuous leaching rapid and easy. The final proof of these speculations came at the Chromium Symposium in Washington in 1986, when Dr. Bidstrop of British Chrome presented unequivocal epidemiological evidence from two plants with over 35 years' experience -- one using lime in roasting, and one without lime. Only the first plant showed increased cancer.

Specificity in Inorganics as well:

Although we have long been accustomed to the biospecificity of similar organic materials (l-amino acids can be used to synthesize protein by animals, whereas d-stereoisomers are useless -- or, fumaric acid can be used as an acidifier in foods, whereas the cis-isomer, maleic acid, is toxic, etc. etc.), the medical profession and the environmentalist research agencies seem not to recognize that the same specificity exists in the inorganic fields. This specificity in inorganic chemistry, related to structural inorganic chemistry, much as organic biospecificity is related to stereo chemistry. But very few physicians or epidemiologists have been educated in this field.

Perhaps the most obvious example is mercury, where toxicity ranges from zero in the amalgam fillings used for a century or more in dentistry and calomel (Hg₂Cl₂) used in early medicine as a purgative, and the antiseptic mercurchrome (in which mercury is coordinated with the π -electrons of an aromatic phthalein dye) to HgCl₂, dimethyl mercury (where mercury is σ -bonded to aliphatic carbon, and mercury vapour itself. So much for specificity, a difficult subject and one which sensible environmental technology cannot ignore, even if legislation does.

EPA is not Infallible

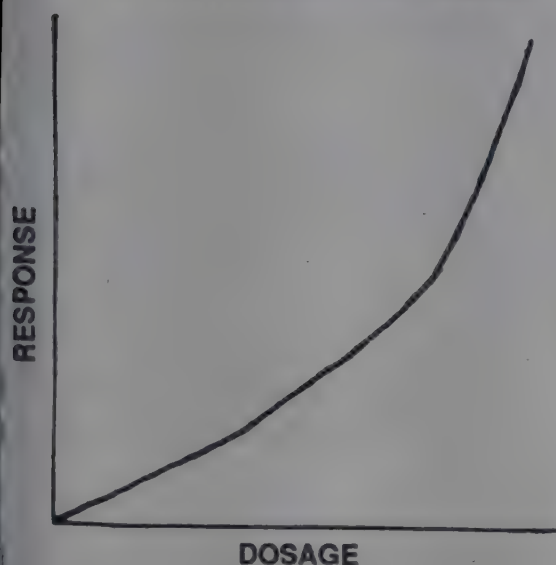
There are two other matters which are conveniently ignored by EPA in its own self-interest, rather than concern for public health and safety. They are the concept of dosage-response curves, and the idea that the method of exposure is immaterial.

The "I" which we have discussed is a rough measure of dosage and we have suggested a rough idea in the readers' mind that the incidence of cancer is proportional to I. However, all the data available suggests that low exposures are proportionately less harmful: this is confirmed by our far more extensive experience with radiation and with tobacco smoking. Qualitatively, we can distinguish types of dosage-response curve: concave upward (general experience), linear (simplistic), and concave downward (exaggerates effect of small doses, and hence increases the cost of control and the authority of the regulatory agency). See Figure on the next page.

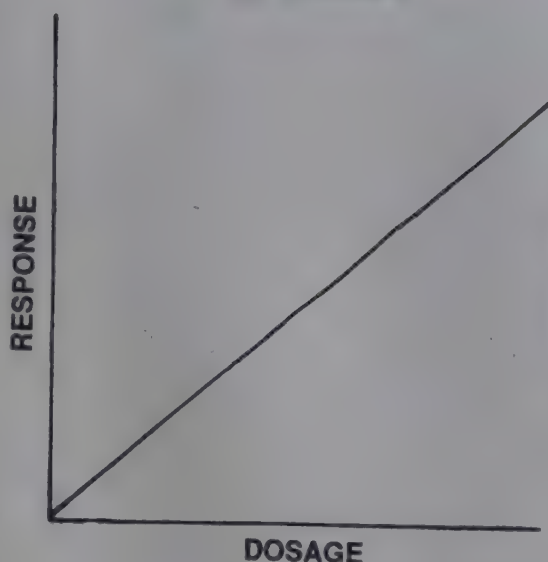
As animal experimentation with carcinogens is frequently done at high dosage to achieve significant results with a reasonable number of test animals, the results usually show a downward curvature. To extrapolate this to the low doses encountered in human exposure

Figure - 1

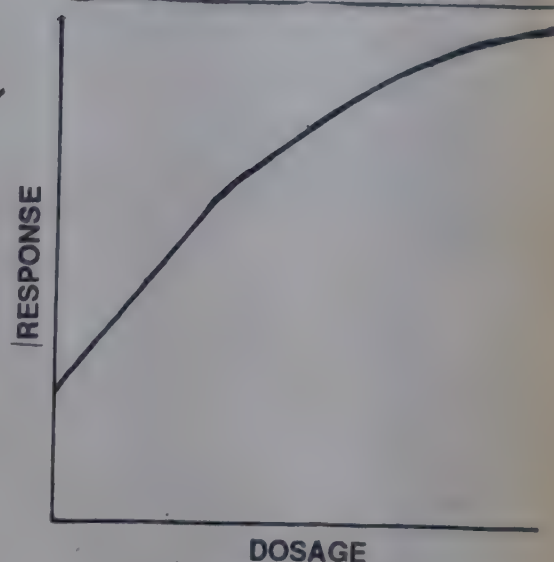
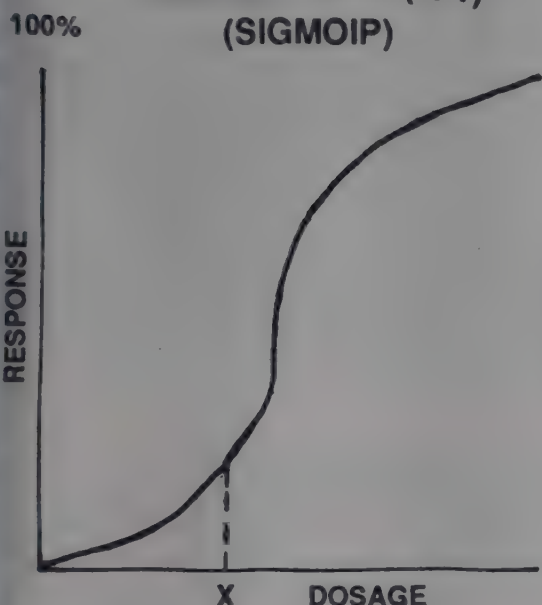
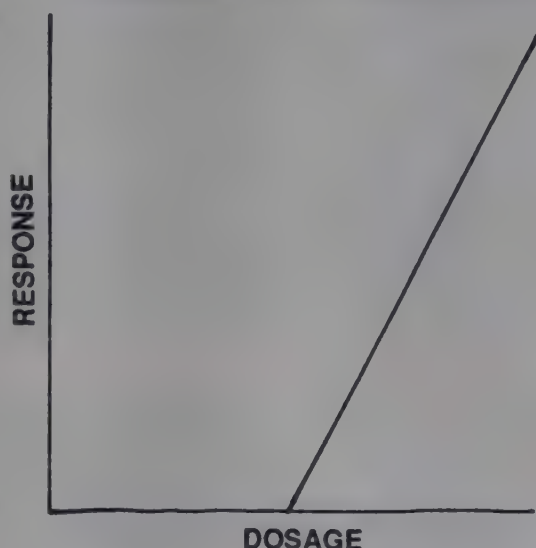
A. CONCAVE - UPWARD



B. LINEAR



C. CONCAVE - DOWNWARD

VARIANT OF A (A-1)
(SIGMOIP)VARIANT OF B (B-1)
(LINEAR WITH THRESHOLD)

experience, either curve C or curves of the A-1 variety can be used. To substantiate their choice of curve C, EPA has published a variant of the "Weibull" statistical distribution, which was developed during the World War II to reconcile the discrepancies between failures predicted from classical sampling and inspection and actual failures in service. (Anyone familiar with these procedures in real life can think of other explanations!). This also relates to a generally discredited "one-shot" theory of carcinogenesis, which is refuted by the standard work of Cairns and Burch.

Both exponential and quadratic curves have been suggested at low doses by the BEIR reports of radiation epidemiologists, while the threshold approach (B-1) was discredited by the Atomic Energy Commission's "negarat" experiment of some years ago. Sigmoid curves, however, are constantly encountered, and have been used in the study of population and corporate

growth (Malthus-Comperts), the approach of chemical systems to equilibrium (logistic curves); the response of crops to insecticides or of wood to treatment with preservatives (log-probability). Of all these, I believe the log-probability response curve is most accurate as a model. It can often simulate (dosage X in curve A-1) the existence of a threshold.

Exposure Mechanisms

There now remains a need for a brief discussion of exposure mechanisms. Roughly, we can distinguish between aqueous (polar) and oily (non-polar) solvent systems.

The human body has been designed by nature to be impervious to changes in the aqueous environment. Immersion in any solution which does not destroy the epidermis by chemical or thermal action poses no risk.

(extensive burns with hot bichromate are serious; they are treated with massive doses of Vitamin C). It is interesting to watch EPA inspectors in "space suits" (for the press and TV) to avoid contact with chromates at a few ppm. Organic chemicals, notably pesticides, are another matter. They are readily absorbed through the skin because they are oil-soluble. Fatalities have occurred from DDT, pentachlorophenol, and malathion, to name just a few. On the other hand, traces ingested on food are harmless.

If chromates in dilute solution are ingested, there is no hazard (see above), for the stomach, being dilute HCl and containing sugars and other carbohydrates from food, simulates the BCS plant. The chromate is fairly rapidly reduced to Cr^{3+} , which is non-toxic and soon discharged into the higher pH of the intestine, where it is precipitated as inert hydrous Cr_2O_3 .

Much of the above story, which I believe has a heavy weight of both direct and circumstantial evidence to support it, has not been published. Nor, because much research is funded to identify risks rather than evaluate them, is the story likely to be accepted by *CW*, American Scientific journal. A similar situation, largely dealing with speciation, existed with the excellent epidermiological work done by Dr. Ross of the U.S. Geological Survey on asbestos, which was not published

under U.S. Government auspices, but rather as a part of the proceedings of an international conference held in Canada. I am suggesting that, if the manufacture of chromium chemicals should pass to countries having reserves of the ore, as I believe it should, then the journals of these countries should take the lead in dispelling the misinformation which the present adversarial-legalistic approach in the U.S. has foisted upon the world. True environmental progress depends, as stated in the title of this section, on the existence of sufficient regulation and technical progress to provide safety for all without incurring excessive cost. As shown in Table below, there is a Law of Diminishing Returns, which has its roots in the Second Law of Thermodynamics.

Table
RELATIVE COSTS AND BENEFITS OF AIR QUALITY CONTROL

Relative level, mg/m^3	1	0.1	0.01	0.001	0.0001
Degree of removal, %	90	99	99.9	99.99	99.999
Cost MM \$	1	5	25	125	625
Cost \$ MM/%	1.11	5.05	25.03	125.01	625.01
Incremental cost, MM/%		44.4	2222	1.11×10^5	5.56×10^6

As I have said, I am not insensitive to hazards, but there must be an end to the fallacy that stricter legislation is the answer.

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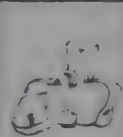
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LEATHER

PARACETAMOL

IP/BP

CHEMICAL Formula

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4' — Hydroxyacetanilide

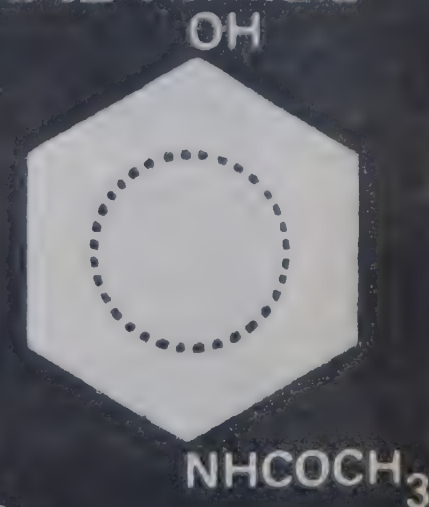
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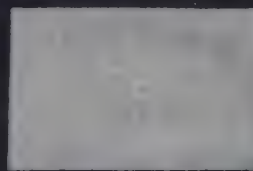
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Chemical News from Abroad

LONG AWAITED STANYL PLANT GETS GREEN LIGHT

Two years after starting up a pilot plant, DSM of the Netherlands has finally decided to build a commercial scale 1,000 ton/year facility for the production of Stanyl, the company's own polyamide (nylon) engineering plastic.

To be built at Geleen, the plant will cost around Dfl.200m (107m) and employ up to 180 people. Construction will begin in the third quarter of this year and the unit is scheduled to be on stream by early 1990.

The long-delayed approval for the commercial scale plant might suggest that DSM's board was wary of the plan. When the pilot plant came on stream in January 1986, the Stanyl development team was confident that board approval would be given later that year paving the way for commercial production in 1989.

Sources at DSM say that the project was never in doubt. But the fact that Stanyl is so new justified the delay and provided the opportunity for DSM, in tandem with its Japanese and US partners, to develop products and undertake extensive premarketing.

Stanyl has uses both as an engineering plastic and in special industrial yarns. It is a very tough, rigid and high temperature-resistant polymer which has a variety of uses including the automotive industry in both under the bonnet and body parts. It can also be used for electrical and electronic equipment.

In the field of industrial yarns, Stanyl can be used as a speciality reinforcing agent for tyres,

belts, hoses, conveyor belts and ropes. It also has applications in high temperature filters.

Stanyl is a variation on the nylon 66 developed by Du Pont in the 1930s. It is produced through polymerization of 1,4 diaminobutane with adipic acid. DSM is well integrated for production of polyamide 46. It has its own acrylonitrile which is used to produce diaminobutane and adipic acid is readily available world-wide.

The product's great virtue is that it offers higher performance than other engineering plastics such as polycarbonates or polyesters. But it can also perform at relatively low cost some of the tasks which are currently carried out by the higher priced, higher performance polyether ketones or polyether sulphones.

Compounding of the DSM polymer will be carried out by the Dutch company at its Genk, Belgium complex and by its partners in Japan and the US. In Japan, these include Japan Synthetic Rubber, Unitika and Teijin. The US partner is Allied Engineered Plastics, a unit of the Allied Signal Corp. DSM is confident that the Geleen plant will be running at capacity fairly quickly and says that new plants in the US and Japan are likely.

KOPPERS' FATE HANGS IN BALANCE

The likelihood of Koppers' chemicals operations coming up for sale was still hanging in the balance as the board of parent company Koppers considered Beazer's improved \$1.85-bn takeover bid. Beazer, the UK building materials concern, up-

ped its first offer for Koppers, a US aggregates firm, in a move to reinforce its existing US building activities.

However, Beazer has already made it known that Koppers' chemical and allied products division is not in line with its own business strategy. If the tender is eventually successful, Beazer intends to sell the chemicals operations. Sources say the company has already received a number of enquiries.

The chemical and allied products business posted net sales of \$60m in 1987, with the parent company issuing \$1.5bn sales for the year. Three sectors exist, covering building materials and wood preservatives based on coal tar derivatives and resins including resorcinol. The coal tar link may draw interest from German chemical companies which used coal tar historically as a raw material. Industry observers put a price tag of between \$400m and \$500m on the chemicals business.

Meanwhile, Koppers is preparing to defend itself against what its board believes is an inadequate bid. Options include recapitalisation or a share ownership scheme.

ICI IN JAPAN PAINT TECHNOLOGY SWAP

ICI Paints has agreed to a technology exchange deal with a leading Japanese supplier of automotive coatings, Nippon Oil and Fats (NOF). For the UK giant, the world leader in paints with sales of £1.3bn (\$2.4bn), the deal provides an important entry into the Japanese car market and should raise ICI's profile in the Far East.

NOF is part of the Fuyo group and makes chemicals, paints and explosives. It is ranked third in the \$400m year Japanese automotive coatings market where the leaders are Kansai and Nippon Paint Company.

The deal makes ICI automotive coatings technology such as the waterborne base coat Aqua-base available, under licence, to NOF in Japan. ICI will licence NOF technology for the automotive markets of North America, Europe and other parts of the world.

ICI will also produce NOF approved paint formulations for sale to Japanese car makers operating overseas. NOF, meanwhile, will produce ICI paint formulations for sale to automotive manufacturers in Japan and other regions of the world.

For the UK group, the benefits include increased business through supplying approved NOF formulations to Japanese car makers outside Japan. NOF likewise will be able to operate on a global basis with a high level of technical support.

An ICI spokesman said the NOF paint formulations will be available in Europe through the planned automotive coatings joint venture with Du Pont.

BPDI ADDS SPANISH CONSUMER PRODUCTS

BP Detergents International (BPDI) is continuing its move into consumer products with the acquisition by its Spanish subsidiary BP Espana of Quimicamp, a manufacturer of household and plant insecticides and swimming pool chemicals.

With insecticides including Casa Jardin, the Zaragoza-based company holds a 35 per cent share of the domestic household and plant insecticide market. It also claims to supply half the Spanish swimming pool chemical market, branded products include Quimicamp Piscinas.

Quimicamp, which posted sales of Ptas 1800m (\$16m) last year, will continue to operate independently, although BPDI will strengthen its position in both domestic and overseas markets. Part of the deal includes the world rights to Casa Jardin and Piscinas. The value of the deal is undisclosed.

BP Espana household, personal care and swimming pool products are to become part of BPDI, which is a division of BP Chemicals International.

CHEMIE LINZ RESHUFFLES TO BOOST PROFIT OUTLOOK

Austria's state holding company OIAG has completed the first round of major restructuring which has transformed its chemicals subsidiary, Chemie Linz, into a new holding company with two wholly-owned subsidiaries and two affiliates. It is hoped that the new organization will swing the group into the black by 1990 after two consecutive years of heavy losses.

In a statement, the new holding company, Chemie Holding AG, said the division of Chemie Linz into smaller units will enable it to improve operations, becoming more market-oriented, efficient and more flexible in response to customer requirements.

Each of the new units has total responsibility for its own operations, while the corporate structure is designed to lay the

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Chemie Holding will be responsible for strategic planning, corporate finance, legal affairs, and environmental activities and public relations. A biotechnological research group, which is presently part of the holding company, is to provide the base for the total biotechnology thrust of OIAG companies.

Consolidated sales for 1988 are forecast at Sch 10.3bn (878m) compared with Sch 11bn in 1987. Chemie Holding is expected to record a loss in 1988 due to a planned injection of Sch 245m into its two subsidiaries and increased costs connected with further job cuts. But the two subsidiaries, Chemie Linz GesmbH and Agrolinz, are forecast to post positive or much improved results. OIAG is providing cash aids for further restructuring totalling Sch 2bn.

Chemie Linz is responsible for the group's chemicals business and a Sch 3bn investment programme is planned for the next three years aiming to change the emphasis from commodities towards speciality products. Currently, commodities account for 70 per cent of sales but Chemie Linz considers this share should be reduced to 50 per cent.

Some Sch 1bn has been earmarked for R&D to boost the high value added product ranges over the next five years, and Chemie Linz's research staff will be increased from 80 to 150. A further Sch 600m will be used for acquisitions of technology, specialized companies and production facilities overseas. The main target markets are the US and Far East. An additional Sch 1bn

will be invested to improve production at Linz.

Chemie Linz says it is committed to production and marketing of commodities such as acrylonitrile, oxo alcohols, plasticizers, melamine, maleic anhydride, fumaric acid and phthalic anhydride. While recognizing that these businesses will be affected by the US dollar exchange rates, Chemie Linz believes they will still provide "reasonable" returns.

The company believes its intensified R&D efforts will boost speciality and intermediate sales from Sch 500m this year to around Sch 1.5bn by the mid 90s. Up to 90 per cent of these sales

are expected to come through foreign sales.

Profits of Sch 100m are forecast for the company over the next two years, and, after a slight drop between 1990-2, are expected to rise again in 1993 as the R&D and investment programme begins to pay off.

Agrolinz, the other wholly-owned subsidiary, has responsibility for the group's fertilizer and agrochemical portfolio. In this sector, a major rationalization and investment programme is already underway. Obsolete plants are being closed and newer improved technologies are being introduced.

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Although Agrolinz is forecast to make a loss of Sch19m this year, it is a major improvement on the Sch650m loss recorded in 1987. The company points out that this was achieved despite no real improvement in the overall European or world fertilizer markets. Operating results are expected back in the black by 1989.

Restructuring is scheduled for completion by 1990 and includes the switch to Odda technology for complex fertilizers and the closure of the old ammonia plant. Personnel levels are expected to fall from 1,400 to 1,250.

Meanwhile, the old Chemie Linz plastics and pharmaceuticals businesses have been spun off into two joint ventures. Petrochemie Danubia (PCD) combines the plastics business of the old Chemie Linz with that of OMV — Austria's state-owned petroleum refiner and distributor.

The new company merges OMV's production operations, with the marketing and sales arm of Chemie Linz. According to OI-AG, the new company will have the size and strength to hold its own in the European and international markets. Activities include fibres, polymers, geotextiles, composites and processing.

Chemie Holding has a 33 per cent stake in PCD. This year the plastics business is expecting sales of Sch7bn of which 80 per cent will be exports.

The other affiliate is CL Pharma, a joint venture with Austria Tabak-werke (ATW) in which Chemie Holding has a 55 per cent stake. According to Chemie Holding ATW's participation

will enable R&D spent to be doubled this year to Sch400m. Total sales are forecast to top Sch2bn in 1988.

MONTEDISON SELLS INTERMEDIATES UNIT

As part of its sale of non-strategic businesses, Montedison has agreed to sell chemical production facilities at Castellanza to a joint venture being formed by Sweden's Perstop and a local company, Polioli. Observers suggest a price tag of L40-45bn (\$32-46m).

Montedison says the plants are profitable but not key to its long-term objectives. The Italian chemical giant has pledged to sell up to L1trillion of non-strategic assets in order to reduce debt. This agreement raises the total sold this year to L340bn.

The plants will be operated by a joint venture in which Pers-torp will hold a majority stake. According to the Swedish company, it intends to continue to run units which "are technologically in good condition". This suggests some older, uneconomic units may close.

Products include pentaerythritol, formaldehyde, formic acid, sodium formate and hydro-sulphite. Perstorp sees the deal as strengthening its position as a leading producer of pentaerythritol and extends its production base into the EEC. The Swedish firm says this latest acquisition will push total Italian sales to around \$60m/year.

AIR PRODUCTS PLANS

Air Products and Chemicals intends to build a FF100m (\$17.6m) gas plant and set up a distribution fleet near Stras-

bourg, France. With a capacity of up to 485 ton/day of oxygen and nitrogen, the unit will serve pipeline, cylinder and bulk customers in north eastern France and southern Germany. Set up is expected in two years.

The development is close to the headquarters of Oxygene Industrie, in which Air Products recently acquired a 65 per cent stake. Meanwhile, the French industrial gases group, Air Liquide, has upped its stake in Oxygene from 31 to 33.7 per cent. This gives it a blocking vote which could use to prevent capital investment by Oxygene. Air Liquide could capitalize and take over the plant itself.

CMRA ANNUAL MEETING

The CMRA program for 1989 — Outlook — Bullish? or Bearish? — was presented at the Grand Hyatt New York. The meeting was concentrated on the problems and opportunities in the Chemical Industry in the nineties.

The opening session featured experts from Europe, Japan, the East and the United States who presented their views on Chemical Industry prospects in the coming decade.

The second session dealt with restructuring and its effect on the Chemical Industry. This was followed by a review of developments in technology leading to new markets in the nineties.

The final session reviewed the outlook for commodity chemicals.

A highlight of this meeting was the presentation of the CMRA Memorial Award to Henry F. Whalen, Jr., Vice President and Director of Chemical Development for the PQ Corporation. Mr. Whalen spoke of the future of Chemical Manufacturing Research.

Chemical Markets Abroad

ONG DEMAND WILL TEN PROPYLENE

Europe's propylene market remained relatively well paced during the first quarter 1988. With few supply interruptions, consumers have been served with contract volume and activity in the spot market has remained subdued. Prices have barely moved so far this year, and after contract prices dropped by DM20/ton to 620/ton for Q1. Early indications are that Q2 business will be at least another DM20/ton lower.

But the market is now set for a major change in the supply/demand balance with increased demand tightening the market and giving an impetus to spot levels. The propylene market is anticipated to grow much more strongly than ethylene this year, with estimates of between 4-6 per cent, pulled along largely by the expected 8 per cent growth in the buoyant polypropylene business.

With Europe's ethylene cracking running at maximum rates during the first quarter propylene supply has been good. Current production is around 7.7m ton, comprising 6.5m ton from steam crackers and a further 1.2m ton from refineries. Demand is running at 7.9m ton, leaving a 0.000 ton deficit which comprises imports of around 300,000 ton from the East Bloc, Libya and South America and exports of 0.000 ton out of Southern Europe to the Far East.

But with such a small percentage of material being provided

by the merchant market, observers are already expressing worries about supply. Increases will have to be met by increased cracker capacity from debottlenecking work, as there is little scope for expansion of refinery propylene capacity leaving the rest to be made up by increased imports, undoubtedly pushing spot levels upwards and raising questions of availability.

In addition, there is an underlying problem of the changing demand patterns for ethylene and propylene. According to estimates by UK consultant Chem Systems, overall growth in propylene is expected to be 2 per cent/year for the next five years, compared with only 1.2 per cent/year for ethylene.

The severity of naphtha cracking is anticipated to decrease from 0.53 to 0.56 propylene/ethylene to help balance propylene at the expense of ethylene. However, at the moment advantageously low prices of LPG and the problems of C₄ surpluses are prompting producers to maximise cocracking of C₄s and cracking of lighter feedstocks which is restricting the supply of propylene.

Meanwhile, current attention in the propylene market is being turned towards negotiations for second quarter contracts. While spot levels have been weak, smaller buyers have been mooting prices as low as DM550/ton but the price setting deal is expected to be BP and BASF, although the two companies have stalled on negotiations at DM-

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580/ton and have suspended talks until after this week's NPRA meeting. With the expected improvement in spot levels, however, some sellers are confident of getting contract prices of over DM600/ton.

Shell is still pushing ahead with plans to introduce monthly contracts on propylene. Although the company has had success with a number of its contract customers, major buyers are still resolutely opposed to the idea. Shell's reasoning is that both parties can benefit by avoiding contract prices becoming out of line with feedstock cost or spot prices. But consumers argue that the monthly price would end up being set in line only with spot prices, and would not take feedstock price changes fully into account.

Other sellers are adopting a "wait-and-see" approach to Shell's efforts, saying that the idea is unlikely to be adopted given the current buyers's market for propylene. However, that could change as derivative demand moves ahead and propylene becomes more of seller's market next year.

SPANISH PET DEMAND SOARS 60 PER CENT

Demand for PET (polyethylene terephthalate) in Spain soared by 60 per cent last year to 15,000 ton and is on target for an increase of 19 per cent in 1988 according to Anaip, the Spanish association of plastic manufacturers.

However, domestic PET production fell well short of this figure, necessitating imports of 8,700 ton of material valued at

some Pta1.5bn (\$13.4m), a 4 per cent increase on 1986.

Spain has two indigenous PET producers, Resinas Sinteticas and La Seda de Barcelona. Resina is a subsidiary of the petrochemicals group Cepsa and its total output is given over to Paliesas, Spain's largest PET processor, another Cepsa subsidiary.

Together with La Seda, which is controlled by Dutch group Akzo, domestic production of PET last year reached only 6,300 ton. The nameplate capacity of La Seda's plant at Prat de Llobregat is 3,300 ton/year, although company sources say this could be expanded to around 10,000 ton/year with some debottlenecking work. In the meantime, Spain will have to rely on imports to meet domestic demand.

EXXON, BASF SETTLE BENZENE CONTRACT

The first Q2 benzene contract has been settled between Exxon and BASF at DM580/ton (\$348/ton), DM145/ton up on Q1. The mid-March settlement surprised the market but it was clear that BASF was anxious to tie up loose ends prior to the Easter vacation and before executives headed to the NPRA meeting in San Antonio.

Reaction to the DM580/ton level has been mixed. Traders long in product said Exxon has extracted a "good deal" and speculated that other market leaders in Europe would follow suit. However, it is now evident that further contracts will not emerge until after the NPRA where the "true tone" of the market is being assessed.

Other traders suggested that in a subdued spot market, which has been hovering around \$340-

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O/ton and looking as if it might drop with lack of hard business, later settlements for contract business could be lower. A sudden surge in toluene buying for HDA conversion could reinforce the bear market sentiment and if this benzene finds its way to the spot market, prices could be forced downwards.

However, with the much talk about aromatics unit closures threatening the market throughout '92, and more recently a two-day closure of the River Rhine following a flood warning artificially tightening inland supplies, other sources say benzene will remain buoyant well into Q2.

Meanwhile, Exxon has posted \$1.15/gallon in the US for April but full judgement is being reserved on this until after the NPAA meeting, traders say.

SYNTHETIC RUBBER DEMAND SET FOR MODEST GROWTH

Worldwide consumption of synthetic rubber grew by 3.1 per cent last year, according to the latest global five year forecast from the US-based International Institute of Synthetic Rubber Producers (IISRP).

The institute projects a significant increase in demand during the period 1987-92, with consumption rising from 9.7m ton to 10.8m ton, an increase of nearly 11 per cent. The US experienced an upturn in synthetic rubber demand in 1987, reversing a trend of previous years and IISRP predicts that future requirements will maintain a modest growth rate.

Western European projections are for slow growth of around 1.1 per cent/year whereas Asia/Oceania and Latin America will both enjoy much higher growth. According to IISRP figures, demand in Latin America will in-

crease by 19.8 per cent over the forecast span compared with 16.4 per cent in Asia.

Centrally planned economy country (CPEC) markets will expand at a rate of some 3 per cent/year for total new rubber consumed, IISRP notes, and synthetic rubber will erode the market share held by natural rubber. It predicts that Eastern Europe will advance by 11 per cent over

the next five years and China/Asia by 36 per cent, with synthetic rubber increasing its market share to over 40 per cent.

Throughout the forecast period, synthetic rubber will represent just over two thirds of global rubber demand, the report states. Tyre manufacturing will continue to be the largest demand sector, although this will decline to around a 43 per cent share.

Synthetic rubber forecast (000 ton)

Area	1987	1988	1992
US	2 523	2 485	2 561
West Europe, Africa, Middle East	1 969	2 000	2 117
Asia and Oceania	1 492	1 550	1 737
Latin America	541	559	648
Total non CPEC	6 525	6 594	7 063
Eastern Europe	2 920	2 980	3 300
China/Asia (CPEC)	300	320	420
Total CPEC	3 220	3 300	3 720
Total World	9 745	9 894	10 783

Source : IISRP

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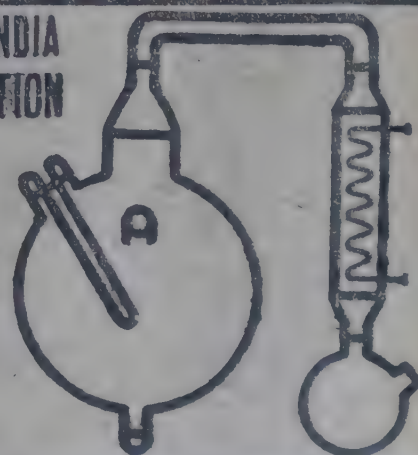
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TURKEY CANCELS METHANOL PROJECT

Turkish trading company Penta Dis Ticaret, had a record high trade volume in 1987, according to Faruk Erkoc, the company's president.

Total exports reached to \$271m last year, of which 70 per cent represented a combination of chemicals, plastics and fertilizers.

Direct imports by Penta to Turkey amounted to \$55m, and again 70 per cent were chemicals, plastics and fertilizers. Imports provided by agency sales to Turkey also rose in 1987 and reached \$42m. Overall this represents an all time high trade volume of some \$368m.

Erkoc revealed that Penta's methanol project planned in cooperation with Soviet partners had been cancelled, due to the high cost of the feedstock, which was to have been imported natural gas from the USSR.

Erkoc confirmed, however, that the project to build a styrene monomer and polystyrene plant was still firmly on the agenda and that a final decision would be made soon.

A new investment company under the name of Penta Petrokimya S.A. has been established to implement this project, which includes plans for 100,000 ton/year styrene and 60,000 ton/year polystyrene.

Bankers Trust Co. of New York, has been chosen as the financial adviser. Negotiations are underway with major licensors and contractors for construction and know how.

PRODAIR STARTS UP FRENCH H₂ UNIT

France's Prodair, a subsidiary of Air Products, has brought a 1,000m³/day high purity hydrogen unit on stream at Toulouse.

The plant, which cost some FF19m (\$1.8m) is built on the site of the Societe national des poudres et explosifs (SNPE) and uses hydrogen co-produced by SNPE in its natural gas reforming unit.

After conditioning, the high-purity product is sold mainly to the regional electronics industry.

Previously, hydrogen was supplied from Belgium but the Toulouse unit will provide high purity product for the southern France market.

TIGHT POLYMERS SUPPLY HITS UK CONVERTERS

1987 was a buoyant year in terms of demand for plastic packaging and film producers, but growth would have been greater had it not been for restrictions in supplies of basic polymers. That is the conclusion of John Sale, chairman of the UK packing and industrial films associations (Pifa) in his annual report to members.

Following consistent rises in raw material prices, which exceeded 50 per cent in the case of polyethylene, Sale warns that the costs have not yet been fully recovered by film producers, and prices are "substantially below those required to ensure the ongoing profitability necessary for re-investment."

Pifa anticipates further growth in 1988, but expects it to be more limited in tonnage terms. It forecasts that there will be continuing tightness in polymer

supply and some further escalation in prices.

The report shows that sales of LdPE and lldPE film grew strongly last year. Domestic sales rose by 11 per cent to 446,000 ton and allowing for imports, apparent total demand rose by 12 per cent to 546,000 ton.

Although polyethylene exports remained low, they increased by 16 per cent to 28,000 ton only to be countered by a similar rise in film imports to 14,000 ton. After some stabilization in 1986 Pifa notes that the share of imports started to grow in 1987 and made a "spectacular gain" during Q4.

Consumption of oriented polypropylene (OPP) in the UK increased by 10 per cent last year to 230,000 ton, although this did not match growth in Europe which was nearer to 15 per cent. Rigid PVC sheeting demand continued to grow strongly, according to PIFA figures. Overall tonnage exceeded 50,000 ton and a high level of usage is expected to continue. The total market for flexible PVC is put at around 15,000 ton and growth is currently around 3 per cent.

CHEMFAIR '88 FILLING UP

Some 30 leading companies have already booked stands for the third International Chemical Trade Fair (CHEMFAIR '88) which is to be held at the Penton Hotel, Heathrow, London, from 11 to 13 October 1988, reports the organiser. Among them is the National Association of Chemical Distributors from the US, a sister organisation to CHEMFAIR sponsors and presenters, the British Chemical Distributors and Traders Association. Options are also said to have been taken on more than two thirds of the available space.

Environment

OECD DEMANDS SAFETY INFORMATION EXCHANGE

Two draft decisions that are set to come legally binding were approved at the first high-level OECD conference on accidents involving hazardous substances. Chaired by the French environment minister Alian Carignon, the meeting was aimed at the chemical and petroleum industries.

Consultation on the siting of potentially hazardous, new installations close to OECD country borders was approved, as was the exchange of information on the safety of existing installations.

Ministers and environmental officials attending the conference also said companies should be obliged to inform neighbouring countries as soon as an accident occurred, which amounted to the setting up of an "international warning system", said Alian Carignon.

The second endorsement made at the conference was for the right of the public to information concerning any hazardous installation and what to do in the event of an accident. The public should have an opportunity to provide suggestions to authorities concerning accident prevention and response.

The OECD Council, which is to meet next May or June, will formally adopt these decisions and they will come legally binding for OECD subscribed countries.

There are no sanctions for failure to observe the decisions but it is understood that the injured party will be able to ask for damages from the country responsible for an accident.

The meeting advocated setting up "an international risk observatory" to exchange information and experiences. Industry representatives present at the conference supported moves for countries to learn from each other's experience in safety technology and management and emergency plans.

Cefic comments that the proposed OECD regulations would have a favourable impact on accident prevention, adding that the French suggestion for an observatory on industrial accidents had good potential — providing it was handled by specialists.

The chemical industry federation, which has been following the OECD accident prevention plans, believes the draft decisions are reasonable for the chemical industry, despite its initial worries over the original text.

UK AEROSOL MAKERS TO HALT CFC USE

Top UK makers of toiletry aerosols are to stop using the chlorofluorocarbons linked with atmospheric ozone depletion by the end of next year. This withdrawal, well ahead of the timetable set by the recent Montreal protocol, has been prompted by consumer concern.

The companies involved are Beecham, Carter-Wallace, Colgate Palmolive, Cussons, Elida Gibbs, Gillette, L'Oreal and Reckitt & Colman. These eight firms account for approximately 65% of UK sales of toiletry aerosols.

DUTCH WASTE BAN

The Dutch Government has banned the use of the industrial area of Moerdijk as a storage and ship-

ment base for chemical waste to be incinerated at sea. This decision means the Netherlands can no longer be used as a waste incineration base in the future, and probably means bankruptcy for the Waste Terminal in Moerdijk (ATM) which already has financial problems.

The incineration company Ocean Combustion Services (OCS) wanted to take over ATM and use it as a storage and shipment base for chemicals -- such as chlorinated hydrocarbons -- to be burnt at sea. OCS has already left Antwerp where it was unable to obtain an operating permit, and it now seems unlikely that OCS will still be interested in ATM.

Dutch minister of environment, Ed Nijpels says there is enough processing capacity for chemical waste in the Netherlands and no requests have come from abroad to store waste in Moerdijk. However, the Dutch cabinet said it would still be willing to receive chemical waste if OCS could not operate out of Antwerp anymore.

RESEARCHERS FIND ALZHEIMER'S CLUE

Researchers at California Biotechnology, Asahi Chemical and other US based research teams have independently reported the finding of a protease inhibitor blueprint within the precursor of the amyloid protein linked to Alzheimer's disease.

It is not known if this inhibitor is related to the mechanism of either amyloid disposition or Alzheimer's, but researchers at Asahi believe that it could be useful for understanding the development of the disease. It is possible that the inhibitor may even be one of the causes of the disease.

News About New Projects

NORSK HYDRO MULLS NEW AMMONIA PLANT IN NORWAY

Norsk Hydro the world's largest fertilizer producer, is contemplating the construction of a new world-scale ammonia plant in Norway. The plan emerged when Hydro presented an outline proposal to the Norwegian government on ways to utilize North Sea gas in Norway.

One scenario, the company said, would be to link Karsto, where the gas lands at present, with Porsgrunn. Another would be to use associated gas from new oil fields at Haltenbanken, which will start production in the 1990s. The gas could be piped to Porsgrunn via the Oslo fjord area.

The Porsgrunn plant, which would need 1bn standard cubic metres/year of gas, is one of several industrial proposals included in Norsk Hydro's outline plan. The company is in discussions with several producers in the Oslo area — minerals, power and pulp & paper — which could also use the gas.

The ammonia plant would for the first time in Norway utilize methane as feedstock in ammonia production. At present wet gas (ethane and propane) is used. If the plan does go ahead a new plant could be in operation in the mid-1990s, lifting capacity at Porsgrunn from the present 360,000 ton/year to around 900,000 ton/year.

With the commissioning of a major plant in the Netherlands last year, Hydro has considerably reduced its ammonia deficit, which is now put at less than 10% of the group's total demand. This, the company says, presents no problems in view of the

cheap ammonia on the world markets.

The new plant would replace some of Hydro's capacity. Two and a half years ago a 130,000 ton/year plant at Porsgrunn was closed down after an explosion. At Rjukan, Hydro plans to shut down during the course of this year its electrolytic ammonia unit. The 115,000 ton/year plant is considered uneconomic and has been running at well under capacity in the last four years.

At Glomfjord, another electrolytic ammonia unit (capacity 120,000 ton/year) is due to be closed-down in the next 3-5 years as provisions are made to use the electricity elsewhere. Ammonia will then be shipped to the site from other facilities and stored in the 40,000 ton capacity tank. Porsgrunn will therefore become Hydro's only ammonia production site in Norway.

Elsewhere, Hydro last year closed down its only Swedish production unit. The 60,000 ton/year plant was based at Koping. Other European ammonia production includes 550,000 ton/year at Brunsbuttel, West Germany, and just over 700,000 ton/year in France. This is supplemented by Hydro's biggest production base, at Sluiskil in the Netherlands, where capacity totals 1.5m ton/year.

Sluiskil is the location of three ammonia units — the oldest AC is a 350,000 ton/year unit; AD (commissioned in 1984) is a 500,000 ton/year plant; and AE (on stream only since last year) has a capacity of 600,000 ton/year. Hydro is also in discussions on ammonia projects in Trinidad and in Western Australia.

Meanwhile the company has def-

initely selected Ambes, near Bordeaux in France as the site for the previously announced 1,150 ton/day nitric acid and 1,500 ton/day ammonium nitrate plants. This replaced an earlier plan to build a new ammonia plant in France. Cofaz subsidiary will supplement ammonia requirements with product bought on the international market.

CHEVRON PICKS CEDER BAYO

Chevron Chemical Co is to build a \$100m linear low density polyethylene unit at its Cedar Bayou plant in Baytown, Texas. The 200,000 ton/year plant will be based on technology licensed from BP Chemicals in the UK.

Chevron decided to build the unit in Baytown for several reasons, including a \$10m, five year tax abatement. Had the company not received a tax abatement in Baytown, Chevron probably would have built the unit at its plant in Orange, Texas, said Chevron spokesman Cul Ingram.

Chevron a major producer of polyethylene has a capacity for 420,000 ton/year of ldPE and 250,000 ton/year of hdPE.

The new two reactor lldPE plant due on stream early in 1991.

SAUDI SOLVENTS

Spie Batignolles of France has won a \$35m contract to build a solvents plant for the Saudi-French Hydrocarbon Solvent Co at Yanbu in Saudi Arabia. The 70,000 ton/year plant will produce aromatic and aliphatic solvents from kerosene and naphtha obtained from Yanbu refineries. Total of France hold a 10% share in the venture. The process is being supplied by Hydrocarbures de Saint-Denis (HSD), a wholly-owned total subsidiary.

TO SPEND POUND 100M WILTON THIS YEAR

Little information is available on the planned pound 100m investment at Wilton in the UK this year. A spokesman for the company said that the individual projects have not yet been sanctioned by the company's main board and are therefore not being revealed in detail.

The plan may include a major new, as yet unspecified project. This emerged during discussions with engineering contractors in December, 1987. ICI's Wilton chiefs said at the time that they expect to start work on their projects in 1988 with one item on the shopping list likely to be a new pound 50m plant, according to the local press reports.

Also, ICI's highly successful purified terephthalic acid facility at Wilton, which has been working flat out, may undergo a further debottlenecking. Last year the unit produced 4,537 ton and the company said that further production was restricted by available capacity.

ICI has also announced that it is considering a new 30,000 ton/year polyethylene terephthalate (PET) capacity at Wilton. A decision on this project, likely to cost over pound 10m, will be taken during 1988, for completion 18 months later.

Other plans may include efficiency improvements to the ethylene cracker, already debottlenecked to 30,000 ton/year capacity, the previously announced polypropylene expansion and a nylon 66 project.

The Wilton complex encompasses three production sites — Wilton, Billingham and North Tees. At North Tees, ICI could look at the aromatics complex and at Billingham at the phenols and amines units.

OXY BUILDS EDC PLANT IN TEXAS

Occidental Chemical (OxyChem) has announced plans to build a \$40m, 360,000 ton/year ethylene dichloride (EDC) plant at Corpus Christi, Texas.

The unit will be constructed adjacent to the chloralkali plant which Oxychem acquired from Du Pont last October. Part of the chlorine will be used to make EDC.

The plant's design is similar to another EDC unit in operation at Oxychem's Convent, Louisiana, chloralkali plant. Construction will take approximately one year.

The Corpus Christi chloralkali plant, idle since July 1986, has a capacity of 1,143 ton/day of chlorine and 1,288 ton/day of caustic soda. When the plant reaches full production at the end of 1988, Oxychem will have total chloralkali capacity of 7,788 ton/day of chlorine and 8,436 ton/day of caustic soda.

PARTNERS INK TENGHIZ PETROCHEMICAL VENTURE

The planned petrochemical complex at Tenghiz in the Soviet Union took a significant step forward on February 4 when the joint venture partners signed a letter of intent to proceed with a feasibility study. The multi-billion dollar project is being eagerly watched for clues as to how the new Soviet policy on industrial collaboration will work in practice.

Signing of the agreement by Vasili Dinkov, Soviet minister of oil production, and the foreign partners, which is due to take place in March, will pave the way for the study to proceed. The foreign partners — Montedison, Enichem, Occidental and Marubeni — earlier agreed to split

their 49% stake in the project equally. The Soviet Union will hold the majority 51% share.

An independent company will probably be appointed to carry out the study which will take approximately one year to complete. If the outcome is positive, a new company will need to be formed, taking the project to the second half of 1989. This will be followed by technology and contractor selection, which will take another year or so, to 1990. The construction itself will take at least three years or to the end of 1993. Completion of the massive complex is therefore envisaged in early 1994, at the earliest.

The feasibility study will give a clearer picture on the likely cost of the project, which has been initially valued at \$5-6bn, and the scope of work.

A world-scale ethane cracker of 400-600,000 ton/year ethylene is likely to be included as well as propane dehydrogenation unit to produce propylene. At least 500,000 ton/year of propylene will be needed to feed the planned 500,000 ton/year polypropylene plant. The complex will also produce 500,000 ton/year of polyethylene and 1m ton/year of sulphur, from sour gas.

Montedison is interested in the polypropylene, Enichem in polyethylene and Occidental in the sulphur. The partners agreed to sell at least half of the total output on the world markets.

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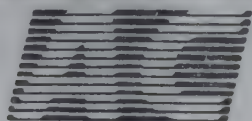
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News from Japan

Centocor To Build Manufacturing Plant For Drugs In Japan

Centocor, Inc. (US) has decided to build a drug plant in Japan 3 to 5 years hence and also construct another drug plant in the States from this year to next year. Construction of the latter is intended to help the start-up of marketing of new drugs after another a few years hence.

The company established last October a wholly owned Japanese subsidiary — Nippon Centocor K.K. The two companies have licensed Takeda Chemical Industries, Ajinomoto and Daiichi Radioisotope Laboratories technology for producing cures and imaging agents and tied up with Toray-Fuji Bionics for sales of invitro diagnostic agents. They are scheduled to soon license major Japanese companies to produce a cure for thrombosis.

The U.S. company is also planning to apply within this year to U.S. and European authorities for production approval of five items of monoclonal antibody-applied drugs. The five comprise two types of imaging agents and three types of cures. An imaging agent helps obtain images of affected parts of the body: antibodies contained therein are marked with radioisotopes.

In addition, it has begun clinical tests for inhouse-developed imaging agents for ovary/breast/prostatic cancer and for a monoclonal antibody for the treatment of ovary cancer. It is also pushing ahead with development of CA72-4 stomach-cancer marker.

The company's inclination toward establishing production

bases abroad is aimed at simultaneously developing, producing and supplying new products throughout the world. This reflects the phenomenon that it has become difficult for biotechnology venture businesses to survive tough trade competition unless they make available abundant biochemicals product lines.

"Construction of a manufacturing plant in Japan is aimed at promoting drug development/manufacture in the country and, in addition in other Asian countries", says Chairman H.J.P. Schoemaker of Centocor.

Science And Tech. Agency Holds 1st Overall High-tech. Symposium

An overall symposium on high technology, which is currently making rapid progress, was held at Nikkei Hall in Chiyoda Ward, Tokyo for three days from March 16, with the participation of front-line experts. At this symposium, the Science and Technology Agency announced the results of research carried out using the funds pointed by its budget for development and adjustment of high technology.

Until now this agency has held debates and symposiums of individual themes, such as new materials, life science and ocean development. It is the 1st time, however, for a symposium to be held with the participation of front-line experts in the many-sided fields of high technology. This symposium is divided into sessions concerned with earth science and technology, material science and technology, and life science. In these sessions, experts have delivered speeches and held dis-

cussions of their respective specialties.

Sumitomo Chem. Will Promote Application Of New Materials

Sumitomo Chemical Co. has announced a plant to construct research laboratories for elaborate-function materials on the site of its Takatsuki research institute. Construction will start this spring at earliest.

The plan is intended to facilitate and speed up application development of elaborate-function resins and other similar substances developed by the company by streamlining and coordinating its R & D activities which have tended to be over specialized.

Cabot To Produce Carbon Black In Japan

Cabot Corp. (U.S.) — the world's largest carbon-black producer — is planning to construct a production base for speciality carbon black (color-use carbon) in Japan in expectation of growing demand for the product. The scale and location of the production facilities will be decided immediately.

The U.S. company also plans to establish a technical-service division within Cabot Far East — its Japanese subsidiary. This move is intended to give timely technical support to user companies.

The company has a total of 19 manufacturing plants in 16 countries throughout the world. For more than half a century it has shipped speciality carbon black to Japan from its factories located in North America and Europe.

It is aiming at stepping up Japanese operations by taking the abovementioned steps.

Mitsui Petrochemical Gets License For Du Pont's Car Fuel Tank Tech.

The Du Pont Company and Mitsui Petrochemical Industries Ltd. announced they have signed agreements covering the distribution of "Selar" RB barrier resins. Mitsui also will sublicense Du Pont's laminar barrier technology to Japanese automotive companies and blow molders enabling them to produce plastic fuel tanks which meet U.S. safety and emissions regulations.

"The combined technical expertise of Du Pont and Mitsui enables us to provide a safe cost-competitive barrier system to the Japanese auto industry," said Richard L. Bell, development engineer for Du Pont Automotive products. "This helps insure that our customers receive a high-quality product backed by strong technical development support."

T. Kawana, director of the Industrial Polymers Department for Mitsui Petrochemical Industries, said, "The 'Selar' RB technology offers an excellent balance between cost, barrier properties and processing techniques for plastic fuel tanks. We are confident that this technology can fully satisfy the needs and interests of the Japanese auto industry."

The agreements between Du Pont and Mitsui support a rapidly growing trend toward the use of plastic instead of steel, for fuel tanks. According to Du Pont, the laminar technology process involving the "Selar" RB resins offers greater design flexibility for added fuel capacity, weight reduction, corrosion resistance, and potential safety and cost benefits.

A recently patented Du Pont process allows "Selar" RB barrier resin to be dry blended with high-density polyethylene and blow molded in one step, using conventional equipment, to produce a fuel tank with an integral laminar barrier. Such tanks can meet U.S. governmental requirements on leakage, fire and crash resistance, and permeation of hydrocarbon vapors.

Du Pont and Mitsui Petrochemical Industries also operate two joint venture companies in Japan. Du Pont-Mitsui Polychemicals Corp., Ltd., manufactures and markets speciality plastics for the packaging and other industries. Du Pont-Mitsui Fluorochemicals Co. Ltd., manufactures and markets fluorocarbon products.

Asahi Chem., M'shi Rayon Pushing PAN Carbon Fiber Operations

Japan's two leading PAN (polyacrylonitrile)-based carbon-fiber makers — Asahi Chemical Industry Co. and Mitsubishi Rayon Co. — announced their business expansion plans separately on February 25, aiming at strengthening operations and exploiting markets for high-grade carbon fiber.

Asahi Chemical has announced completion of a pilot plant for "2nd generation" carbon fiber with high strength and medium elasticity, sales of a new type of carbon fiber dubbed "12K" as well as the name change of its wholly owned carbon-fiber company to illustrate its emphasis on this business. Mitsubishi Rayon has also revealed plans for construction of a 350-t/y carbonization plant for its "PYROFIL" PAN-based carbon fiber at its Toyo-

hashi factory and the capacity expansion of its carbonization plant at its Otake factory.

These steps by both companies show their strong interest in carbon-fiber business which will they expect, be the target of growing demand, particularly for sophisticated carbon fiber in future. It is also believed that they consider it necessary to strengthen their business setups in order to catch up with two major forerunners in this field — Toray and Toyobo Rayon.

Asahi Chemical has completed a 50-t/y pilot plant on the site of its Fuji branch office and also developed "12K" carbon fiber ("Hi-Carbolon EW") which is excellent in wide-spreadability (number of filaments 12,000). The carbon fiber produced by the pilot plant has tensile strength of 550 kg/mm² and elastic modulus in tension of 30 tons/mm² and 23-24 tons/mm² for the standard type.

In a related development the company decided to change the name of Asahi Nippon Carbon Fibre Co. its subsidiary, to Asahi Kasei carbon Fibre Co. as of April 1.

It is trying to expand markets for the product for use in aircraft parts and expensive sport and leisure goods as well as other special goods.

Mitsubishi Rayon will construct a 350-t/y plant for "PYROFIL" carbon fiber at the Toyohashi factory and has decided to expand the capacity of its Otake carbonization plant from 120 to 150-t/y. The plans will give it a combined capacity of 500 t/y and will cost about ¥6 billion. Construction of the new plant at Toyohashi is scheduled to start in July and completion is set for the summer of 1989.

New Developments from Japan

Liquid-grade Reactive Dye Developed for U.S. Sales

Sumitomo Chemical Co., has commercialized liquid-grade "Sumifix Supra" reactive dye in response to on going factory automation for dyeing business and requirements for improving working conditions. "Sumifix Supra" dye originally came only in powder form.

The new product is available in four types of color, which are roughly classified into red and yellow. The company plans to market the product mainly in the States.

Each molecule of the product has two reactive groups — vinyl sulphone and monochlorotriazine. The dye attaches itself to the targeted material at the points where the two groups link, thereby producing a markedly high degree of resistance against light, sweat and washing.

In commercializing the liquid product, it was difficult to set the pH of the product at an appropriate level. Vinyl sulphone and monochlorotriazine are easily affected by acids and alkalis, respectively. The company has succeeded in commercializing the liquid dye by setting its pH at an alkaline level. In addition, it has improved the water solubility of the product through thorough desalting treatment of the product itself.

In ordinary reactive dyes, each of their molecules has a single reactive group such as dichlorotriazine, monochlorotriazine or vinyl sulphone.

B-Sialon Sinter With Higher Acid Resistance Developed

Nippon Kokan K.K. has developed a B-sialon ceramic sin-

ter having high acid resistance and high strength at high temperatures. B-Sialon is one of the advanced ceramics that feature high corrosion resistance.

The new sinter is hardly oxidized at 1,500°C and exhibits a bending strength of 80 kg/mm² at 1,300°C compared with 100 kg/mm² at room temperature. These figures are much higher than those of conventional B-sialon sinters.

The development was based on the technology of Government Industrial Research Institute, Kyushu and the company will offer the sinter to the institute for evaluation testing.

The company will soon make sample shipments to users. It is considering commercializing the product in future for use as turbine blades and the parts of equipment which require high corrosion resistance at high temperatures.

Shimadzu, M'bishi Tie with U.S. Chromatography Firm

Shimadzu Corp., a precision equipment maker connected with the Mitsubishi group, said it has bought equity in and concluded a contract with Suprex Corp., a Pittsburgh-based manufacturer of chromatography equipment.

According to the contract, Shimadzu will market the U.S. venture business' equipment in Japan as well as providing it with technical co-operation.

The first product to be marketed in Japan by Shimadzu will be Suprex's SFC/200A, a supercritical fluid chromatography system that can be used for analyzing such substances as polymers, pharmaceuticals, foods, petrochemicals and pesticides.

These materials have proved difficult to analyze with conventional gas or liquid chromatography, Shimadzu said.

Shimadzu will sell SFC/200A in Japan for ¥8.5 million and expects to sell 20 sets in the first year for total sales of some Yen 150 million.

Chromatography is a technique for separating chemical substances from a stream of moving gas or liquid using a stationary material. The substances separate at different rates as they are absorbed into the stationary material, thus enabling scientists to analyze various materials.

Top U.K. Drug Firm to Build Basic Research Base in Japan

Glaxo Holding Ltd., the U.K.'s top drug maker, will construct a basic research base for drugs in Japan under its global R & D strategy. It wants the location to be Tsukuba Academic New Town where many scientific research organizations have gathered and is considering purchasing land there.

If it buys a plot of land within this year, construction will start next year, according to informed sources.

Glaxo began listing its stock last year on the Tokyo Stock Exchange in a bid to consolidate its business activities in Japan and now considers Japan as a strategical area for drug R & D activities along with the U.S. and Italy in addition to the U.K.

Glaxo has a research organization in Tokyo which has been operated by Shin Nihon Jitsugyo Co., a member company of the Glaxo group, but this organization has committed itself mainly to pharmacological and safety studies on new drugs developed abroad and to clinical testing in Japan as well as

Dicalcium phosphate (Anhydrous)	16.00	Sodium sulphate (Fine)	6.00	Butyl acrylate	95+
Ferric chloride (Lumps)	6.50	Sodium sulphate (Coarse)	5.00	Butyl stearate	38.
Ethylene urea	56.00	Sodium sulphide 50-52% (Flakes)	8.00	Butanol (Resale)	34.
Glue flakes	8.45	Sodium sulphide 58-60% (Flakes)	9.00	Benzyl chloride	24.
Glue sheets	6.75	Sodium sulphide pure (Flakes)	12.25	Benzo trichloride	16.
Gohsenol GH-17	87+ST	Sodium nitrite (Resale)	16.00	Benzoyl chloride	22.
Hydro	38+ST	Sodium chlorite 80% (Spain)	92.00	Bromine Liquid	42.
Hyflosupercell	18+ST	Sodium chloride 50% (Spain)	81.00	Chloroform	24.
Hexamine (Resale)	40.00	Santobrite (Indian)	36.00	Carbon Tetrachloride	13.
Industrial Wax	25.00	Soda Ash (Tata)	4.00	Cellosolve	44.
Litharge	15.00	Soda Ash (Birla)	3.80	Cyclohexanone	47+
Lead Acetate (Tech.)	28.50	Soda Ash (Imp.)	3.50	Cyclohexanol	43.
Lithopone	15+ST	Sodium bicarbonate	5.25	Diacetone (Resale)	35.
Magnesium chloride (crystal)	1.80	Sodium bisulphite	4.50	Diethyl Oxalate	34.
Menthol crystal (Flakes)	185+Ex.+ST	Sodium silicate	3.00	Diethylene glycol (DEG)	35.
Menthol bold	205+Ex.+ST	Sodium acetate	6.00	Diethyl Phthalate	52.
Menthol crystal bold	245+Ex.+ST	Sodium alginate	110+ST	Diallyl Phthalate	56.
Magnesium carbonate (Japan)	16.00	Titanium Dioxide (Anatase)	50+ST	Dimethyl Phthalate	28.
Magnesium carbonate (Indian)	15.00	Titanium Dioxide (Rutile — RCR ₂)	69+ST	Diethyl Adipate	52.
Maleic Anhydride (per kg) (Resale)	45.00	Tartaric acid (Crystal)	94.00	Dibutyl Adipate	42.
Mercury (75 lbs.)	9,000.00	Trisodium phosphate	4.80	Dipentene	15.
Nickel chloride	90.00	Thiourea	70+ST	Dimethylamine 40%	12.
Oxalic acid (Resale)	20.00	Urea (Tech)	2.75	Dimethylamine 60%	14.
Peppermint oil (Rectified)	90+Ex.+ST	Vacuum salt	1.00	Ethyl Acetate	20.
Potassium carbonate (Indian)	19.00	Zinc Dust	30.00	Ethyl Acrylate	46.
Potassium carbonate (Imported)	21.00	Zinc Oxide	30.00	Ethylene Dichloride	11.
Potassium bichromate	22.00	Zinc chloride powder (technical)	14.00	Ethylene Glycol	23.
Potassium phosphate (Mono)	14.00	Zinc sulphate	4.00	Formic Acid (Imp) (Resale)	27.
Potassium phosphate (Di)	14.00			Formaldehyde (Resale)	7.
Polyvinyl alcohol (No. 117)	88.00			Glycerine (CP)	50.
Polyvinyl alcohol (No. 173) (Resale)	92.00			Glycerine (IW)	49.
Polyvinyl alcohol (No. 208)	78.50+ST			Hydrogen peroxide 50% (Resale)	29.
Paraformaldehyde (Resale)	20.00			Isopropyl Alcohol	17.
Phthalic anhydride 36% (Resale)	24.00			Iso Butyl Alcohol	28.
Pentaerythritol (Resale)	51.00				(Resale) 30.
Paraffin wax (Resale)	14.50			Monoethanolamine (Resale)	47.
Rangolite (German)	70.00			Melamine	51+
Rangolite (Czech.)	50.00			Methyl Ethyl Ketone	41.
				Methyl Isobutyl Ketone	36.
				Methyl Acrylate	42.
				Methyl Dichloride (Resale)	22.

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Naphthalene (Refined)	22
Naphthalene (Refined)	24
Ortho Anisidine (OA Imp)	83
Ortho Dichloro Benzene (ODCB)	10
OT Base	92
Para Dichloro Benzene (PDCB)	16
Para Anisidine (PA-Imp.)	110
Para Anisidine (PA-Local)	87
PNA	68
Para Cresidine (Imp.)	325
Para Amino Azo Benzene (India)	125
PNCB	28
Para Amino Acetanilide	145
1-Phenyl 3-methyl-5 Pyrazolone	120
Phenyl J. Acid	360
Para Amino Benzoic Acid	170
PT Base	88
Rhoduline Acid	490
Resist Salt	20
Resorcinol	140
Sodium Naphthionate	64
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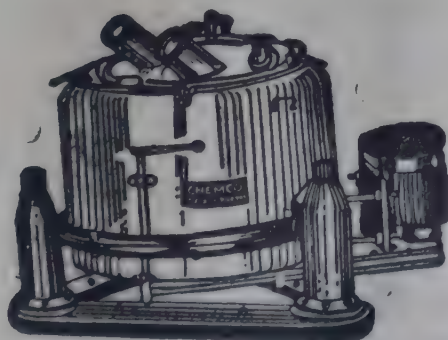
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Acid Orange II	77.80	Red IIR	72.55	Blue BG Powder	235.4
Acid Orange ILY	63.05	Red 4B	169.10	Blue BN Powder	103.7
Acid Red A	107.25	Bordeaux BW	132.30	Blue D 2R Powder	476.2
Crosein Scarlet MOG	155.00	Fast Scarlet 4BS	166.55	Navy BT Powder	243.9
Acid Scarlet 3R	99.90	Red 12B	170.55	Blue B 2G Powder	210.2
Acid Red 38N	135.00	Bordeaux Hly Conc.	194.00	Black BT Powder	182.6
Acid Red R2R	132.00	Cotton Red N	117.05	Blue BR Powder	390.2
Acid Red RS	88.00	Brill. Fast Helio B	278.00	Yellow 7GL	338.6
Acid Green V	230.00	Brill. Fast Helio 2B	297.00	Yellow 5RX	218.8
Acid Patent Blue AS	250.00	Brill. Fast Helio 2RS	136.20	Yellow 3G	367.2
Acid Coomasi Blue	200.00	Brill. Fast Helio BS	116.10	Yellow	140.0
Acid Yellow 5GN	65.00	Brill. Violet Extra	126.40	Yellow AL	135.0
Acid Red PG	85.00	Blue 2B	86.40	Yellow Brown REL	247.5
Acid Red GRS	78.00	Blue G	170.50	Yellow FFL	463.0
Acid Black 10 BX	121.95	Sky Blue FB	188.25	Gold Yellow GG	259.7
Acid Black BX	98.40	Copper Blue GR	147.00	Pink REL	247.0
Acid Black Wax	135.50	Fast Greenish Blue GL	114.60	Red REL	468.0
Procinil Yellow GS (ICI, UK)	265.00	Developed Black BT	116.10	Red 2B	327.4
Procinil Red GS (ICI, UK)	530.00	Blue NB-2B	300.20	Red FB	324.0
Procinil Blue RS (ICI, UK)	315.00	Blue NB-2BC	185.30	Red Violet FBL	469.0
Procinil Scarlet G (ICI, UK)	600.00	Developed Black NB-GHB	185.30	Orange 3R	196.0
Procinil Orange G (ICI, UK)	250.00	Green B	111.65	Violet 3R	280.0
Procinil Rubine (ICI, UK)	550.00	Green NB-B	188.25	Violet RL	275.0
		Green 2B-N	188.25	Violet 6R	485.0
		Brown MR	154.40	Scarlet RR	214.0
		Brown CN	107.25	Rubine 3B	223.0
		Golden Brown G	140.35	Rubine CB	364.0
		Catechin G	120.50	Blue GL	318.0
		Omega Tan	126.40	Blue BGF	636.0
		Catechin GS	102.80	Navy Blue RF	270.0
		Black E Hly Conc.	142.60	Brown 3REL	200.0
		Black E Extra Hly Conc.	142.60	Black GEL	324.0
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Gun Yellow RCH	124.00			Fast Orange GC	135.0
Fast Yellow GCH	141.15			Fast Scarlet R	166.0
Yellow CFG Hly. Conc.	312.00			Fast Scarlet RC	126.0
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Fast Yellow CHRS	95.45	Yellow 6G Powder	143.80		
Viscose Orange	166.15	Red B 3B Powder	247.80		
Fast Orange GR	133.75	Red B 2B Powder	323.20		
		Red CB Powder	439.15		

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Scarlet GN	91.50	Brill. Blue H 5G	173.10	Brill. Blue 2R Hly. Conc.	378.55
Scarlet GG	72.70	Blue H 5R	283.85	Brill. Blue 2R Supra Disp.	115.65
Scarlet GGS	72.75	Brill. Blue H 7G	178.70	Dark Blue 2R Powder Fine	389.25
Red B	203.20	Brill. Blue H 7RX	358.15	Blue BC Supra Disp.	359.40
Red RC	119.15	Turquoise HA	234.45	Jade Green XBN Powder Fine	438.20
Red R Flakes	149.25	Supra Blue H-3RP	335.70	Jade Green XBN Acra	
Red TR	166.80	Supra Turquoise H 2GP	181.50	Conc. Powder	823.90
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Red KB Oil	201.90	Blue H-ERD	305.80	Jade Green XBN Ptg. Paste	126.00
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Violet B	605.60	Brill. Blue M RX	214.20	Olive D Pdr. Fine	444.30
Blue BB	521.45	Brill. Blue M-G	382.30	Olive Green B Supra Disp.	308.25
		Blue M 4GD	344.60	Jade Green XBN Supra	
PHTHOL COLOURS		Navy Blue M RB	318.75	Disp. (N)	327.30
	Per Kg	Turquoise M-G	197.85	Olive OMW Pdr. Fine	698.55
S	217.00	Brill. Blue M GX	302.50	Olive OMW Supra Disp.	538.05
	143.00	Blue 3R Acra Powder	718.20	Olive R. Pdr. Fine	422.95
SW	279.75	Dark Brown H 6R	248.45	Olive R. Pdr. Fine	422.95
BS	189.15	Cobalt Oxide (per kg)	285.00	Olive D Supra Disp.	361.70
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D	175.50	Green H-E4B	169.80	Olive D. Ptg. Paste	193.00
OL	179.35	Red Brown H IF	143.25	Olive Green B. Ptg. Paste	199.10
TR	279.75	Orange Brown H 28	209.05	Olive Green B Acra Conc.	542.75
PH	279.75	Brown M GRN	188.60	Olive R Acra Conc.	640.00
E	196.05	Black H-N	283.35	Olive Green B Acra Conc.	542.75
EI	184.40			Brown R Pdr. Fine	835.00
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lden Yellow HR	181.80	Black GXR	61.60	Dark Brown 3R Supra Disp.	414.55
ll. Yellow H4G	117.85	Black Grains 800	54.20	Brown G Acra Conc.	733.95
pra Yellow H-8GP	168.55	Black EXR Grains	64.55	Brown R Acra Conc.	766.00
ll. Yellow HE6G	166.95	Black EXR Grains 800	51.25	Grey M. Powder Fine	768.80
llow H-E4R	276.05	VAT COLOURS (ICI)		Grey M. Supra Disp.	585.45
ll. Yellow H7G	332.30		Per Kg	Blue BC Acra Conc. Pdr. Fine	762.70
llow M4R	243.95	Yellow 5G Powder Fine	673.15	Direct Black AC Supra Disp.	330.35
llow M GR	326.05	Yellow 5G Supra Disperse	439.30	Direct Black AC Pdr. Fine	474.70
ll. Yellow M4G	177.10	Yellow 5G Acra Conc.	628.75	Direct Black CH Supra Disp.	393.20
ll. Yellow M8G	332.30	Yellow 3R Powder	588.85	Direct ACD Ptg. Paste	217.15
llow M 3R	217.60	Gold Orange 3G Pdr. Fine	952.15		
ll. Orange H 2R	241.85	Brill. Orange 6R Pdr. Fine	624.35		
ll. Red H 7B	157.95	Gold Orange 3G Supra Disp.	601.30		
ll. Orange M 2R	313.15	Brill. Orange 6RX Powder	394.30		
ll. Red H 85	169.45	Brill. Red 3B Pdr. Fine	997.80		
ll. Scarlet H RN	245.05	Brill. Red 3B Supra Disp.	713.20		
pra Red H-3BP	179.30	Brill. Purple 4R Conc. Pdr.	470.75		
ll. Red H-F3B	243.45	Brill. Purple 3R Acra Powder	690.85		
ll. Magenta H8	167.00	Brill. Purple 2R Hly Conc.	597.90		
ll. Red M. 5B	98.90	Brill. Purple 4R Supra Disp.	500.05		
ll. Red M 8B	173.70	Brill. Purple 2R Acra Conc.	625.95		
ll. Pink MB	137.10	Blue R Powder Fine	542.15		
ll. Magenta MB	121.55	Blue BC Conc. Pdr. Fine	522.50		
ll. Purple H-3R	180.20	Blue BC Acra Conc. Pdr. Fine	762.70		
ll. Purple H-7R	175.40	Blue R Conc. Pdr. Fine	577.65		

Madras Market

Market conditions were steady. Caustic Soda has registered an increase due to short supply and better up country enquiries. Methanol con-

tinues to be in short supply. HOC has announced reduction in the prices of acetone and the impact is likely to be felt only during the coming week.

(MADRAS MARKET RATES AS ON APRIL 30, 1988)

Acetic Acid — Glacial (per kg)	18.00	Hydrosulphite of Soda TCPL (per kg.)	32.00
Acid Slurry (Soft) (per kg)	26.00	Hydrosulphite of Soda IDI (per kg)	36.00
Aluminium Sulphate Iron free (per tonne)	1,700.00	Hydrosulphite of Soda BASF (per kg.)	38.00
Ammonium Bi-carbonate (per 25 kg.)	125.00	Hydrogen Peroxide (India) (per kg.)	35.00
Ammonium Chloride SPIC (per tonne)	1800.00	Hyflo Supercell	19.00
Bleaching Powder — Mettur (per 25 Kgs. bags)	100.00	Magnesium Carbonate Light	18.00
Borax Granular	640.00	Potassium Bichromate (per kg)	26.00
Cresylic Acid 100% (per kg)	85.00+E.D.	Phosphoric Acid (per kg)	18.00
Meta Cresol 40/42% (per kg.)	39.00+E.D.	Phthalic Anhydride (per kg)	28.00
Para Cresol 95% (per ton)	60.00+E.D.	Pentaerythritol (per kg)	52.00
Caustic Soda Flakes (Mettur) (per ton)	8800.00	Paraffin Wax (per kg)	13.50
Caustic Soda Flakes (Andhra sugar)	8800.00	Oxalic Acid (per kg.)	20.00
Citric Acid — Indian (per kg.)	42.00	Soda Ash (TAC) (per 75 kg)	325.00
Copper Sulphate (per 50 kg.)	1000.00	Soda Ash (TATA) (per 75 kg)	325.00
Formic Acid (India) (per kg)	27.00	Sodium Cyanide Indian (per kg.)	47.00
Formaldehyde (per kg)	9.00	Sodium Cyanide Degussa (per kg)	75.00
Glycerine (per kg)	42.00		

Sodium Bichromate (per kg)	20.00
Sodium Bicarbonate (per 50 kg)	280.00
Sodium Nitrite (per 50 kg)	660.00
Sodium Nitrate (per 50 kg)	450.00
Sodium Silicate (per tonne)	4000.00
Sodium Sulphate (per tonne)	3500.00
Sodium Sulphide Flakes (per tonne)	13,000.00
Sodium Bi-sulphite (per 50 kg.)	185.00
Stearic Acid (per kg)	30.00
Trisodium phosphate (per 50 kg)	350.00
Titanium Di-oxide Indian TTP (per kg)	52.00
Titanium Di-oxide Indian Rutile (per kg)	62.00
Urea Tech (per tonne)	2800.00
Zinc Oxide (per kg.)	34.00
Zinc Chloride Powder (per kg.)	13.00
Zinc Sulphate (per tonne)	4,500.00
Di-octyl phthalate (per kg.)	47.00
Di-butyl phthalate (per kg.)	47.00
Hexamine (per kg)	28.00

SOLVENTS

Acetone (H.O.C.) (per kg.)	18.00
Isopropyl Alcohol NOCIL (per kg.)	21.50
Diacetone Alcohol NOCIL (per kg.)	28.50
Benzene SAIL (per kg)	15.00
Diethylene Glycol NOCIL (per kg)	33.00
Butanol NOCIL (per kg.)	34.00
Butanol NOCIL (per kg.)	33.00
Toluene SAIL (per litre)	15.00
Xylene IPCL (per litre)	16.00
Phenol HOC (per kg.)	28.00
Turpentine (per litre)	16.50
Sorbitol (per kg.)	30.00
Trichloroethylene MCIC (per kg)	23.50
Carbon Tetra Chloride (per kg)	16.00
Chloroform (per kg)	25.00
Methylene chloride (per kg)	24.00
Methyl Ethyl Ketone (per kg.)	42.00
Cellosolve (per kg.)	50.00
Triethanolamine (per kg)	23.50
Ethyl Acetate (per kg.)	22.00
Butyl Acetate (per kg)	40.00
Methanol (per litre)	8.00

Delhi Market

DELHI: APRIL 29, (NNS) — A sharp spurt of Rs. 500 in mercury provided the main feature of trading during last week says NNS. Sodium nitrite also recorded a handsome gain of Rs. 100 whereas tartaric and citric acid declined by Rs. 100/150. Turnover was poor.

The MMTC revised the rates of mercury from Rs. 8700 to Rs. 9500 per flask and consequently mercury recorded a handsome gain of Rs. 500 at Rs. 9500 due to acute shortage of stocks and good enquiries. Higher advances from Bombay also aided the upward trend. In the absence of fresh inflow along with acute shortage of stocks, sodium nitrite advanced sharply by Rs. 100 at Rs. 850/900 whereas sodium nitrate ruled quiet at Rs. 400/425.

Tartaric acid crashed by Rs. 100 at Rs. 6850 per 50 kg. due to improved supply and slack demand. Citric acid (Bombay Dyeing, bold quality) tumbled down by Rs. 150 at Rs. 2400 thanks to fresh offerings, while small quality ruled static at Rs. 2250. Cam-

phor thal and powder slipped by Rs. 2 at Rs. 97 and Rs. 86 on easy supply and slack demand by local and up-country traders.

Menthol flake drifted lower from Rs. 184 to Rs. 178 and bold from Rs. 205 to Rs. 198 in the absence of buyers. Menthol medium was being offered lower at Rs. 188 against Rs. 200 on poor sale as well as poor stocking tendency due to acute shortage of money. Mentha oil ruled easy at Rs. 178 and and DMO at Rs. 70 per kg. Formic acid lacked support and reacted downward by Re. 1 at Rs. 28 per kg. Hydrogen peroxide ruled quiet at Rs. 32. Soda bicarb placed lower at Rs. 255 against Rs. 260 on improved supply. Paraffin wax however advanced by Rs. 20 on tight stock position and fall in fresh supply. Refined wax ruled static at Rs. 700. Caustic soda flake ruled quiet at Rs. 400/405 on poor enquiries.

Most of the dyes and colours ruled static in the absence of outside demand.

Formic acid (per kg)	28.00
Formaldehyde (per kg)	8.00
Hydrogen Peroxide (per kg)	32.00
Calcium Carbonate (per tonne)	2500-4000.00
Acid Slurry Soft (per kg)	22.00
Acid Slurry Hard (per kg)	30.00
Phosphoric Acid (per 50 kg)	825.00
Pot. Nitrate (per quintal)	900-1200.00
Pot. Permanganate (per 50 kg)	2300.00
Sod. Bichromate (per 50 kg)	1025-1125.00
Tri-Sod. Phosphate (per 50 kg)	340-350.00
Titanium Dioxide Anatase (per kg)	49.50
Titanium RC-822 (per kg)	64.00
Zinc Oxide (per mt)	32000-38000.00
Phenol Carbolic Acid (per kg)	33.00
Carbon Tetrachloride (per kg)	17.50
Chloroform (per kg)	26.00
Sodium Sulphate (per 50 kg)	160.00
Naphthalene Balls (per 50 kg)	1400.00

(DELHI MARKET RATES AS ON APRIL 29, 1988)

Ammonia Bicarb (per 25 kg)	118.00
Mercury (per flask)	9500.00
Soda ash (per bag)	270-295.00
Ammonium chloride (per 50 kg)	115-180.00
Caustic soda solid	No Stock
Caustic soda flakes (per 50 kg.)	400-405.00
Citric acid (per 50 kg)	2250-2400.00
Stable Bleaching Powder Shriram (per 25 kg)	95.00
Stable Bleaching Powder KCI (per 25 kg)	85.00
Stable Bleaching Powder MODI (per 25 kg.)	90.00
Sod. Bicarbonate (per 50 kg.)	255-275.00
Sod. Hydro Sulphite (per kg)	34.50-36.00
Rangolite (per kg)	50-70.00

Boric acid Technical (per 50 kg)	980.00
Paraffin wax (per 50 kg)	610.00
Tartaric acid (per 50 kg)	6,850.00
Borax Granular (per 50 kg)	570.00
Borax Crystal (per 50 kg)	575.00
Sodium Nitrate (per 50 kg)	400-425.00
Sodium Nitrite (per 50 kg)	850-900.00
Camphor Powder (per kg)	86.00
Camphor Thal (per kg)	97.00
Menthol Medium (per kg)	188.00
Menthol Flakes (per kg)	178.00
Menthol Bold (per kg)	198.00
Glycerine (per kg)	42-43.00
Sodium Silicate (per quintal)	200-250.00
Hexamine (per kg)	40.00
Acetic Acid Glacial (per kg)	13-13.50
Copper Sulphate (per quintal)	1800-2100.00

DYES & COLOURS per kg

Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES (per kg)

Black E. Conc.	92-155.00
Diazo Black B.T.	125.00
Green B.	119.00
Blue 2-B	86.00
Sky Blue FB	200.15
Basic Auramine O' Conc.	55-100.00
Basic Rohdamine B. 500%	220-320.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

MATERIALS IMPORTED

BOMBAY

(From 15.1.88 to 19.1.88)

(Cost of Imported Item is
CIF Value)

ACETANILIDE: From Italy:
Standard Organics Ltd., 60,000
kgs., Rs. 8,95,844/-.

ACETIC ANHYDRIDE: From
Germany: Priya Chemicals, 12,-
200 kgs., Rs. 1,38,596/-.

ACETIC ANHYDRIDE MINI-
MUM 98%: From Germany:
Triochem Products Ltd., 30,400
kgs., Rs. 3,05,878/-.

ACRYLAMIDE: From Japan:
Bhadresh Chemical Industries,
5,000 kgs., Rs. 99,924/-; Ashok
Dyechem, 1,020 kgs., Rs. 22,-
282/-; Arjyot Chemicals P. Ltd.,
2,000 kgs., Rs. 43,701/-; Sagar
Paints Co., 2,040 kgs., Rs. 42,-
378/-.

ALPHA AMYLASE ENZYME:
From Denmark: Raptakos Brett
and Co. Ltd., 600 kgs., Rs. 52,-
730/-.

ALPHA PINENE: From Fin-
land: Camphor and Allied Pro-
ducts Ltd., 1,26,000 kgs., Rs.
15,58,277/-; From China: Cam-
phor and Allied Products Ltd.,
98 MT., Rs. 11,25,839/-; 98
MT., Rs. 11,25,838/-.

ALUMINIUM OXIDE SYNTHET-
IC: From F.R.G.: Mukul Enter-
prises, 72,000 kgs., Rs. 9,67,-
984/-; From Japan: Grindwell
Norton Ltd., 4,000 kgs., Rs. 1,-
47,012/-.

ALUMINIUM CHLORIDE HY-
DRATED: From Germany: Biolo-
gical Evans Ltd., 480 kgs., Rs.
18,890.

ARSENIC TRIOXIDE 98%
(SNOW WHITE): From China:

R.L. Corporation, 19,000 kgs.,
Rs. 1,40,219/-.

ATRAZINE TECHNICAL: From
U.K.: Rallis India Ltd., 19,995
kgs., Rs. 8,98,347/-.

BETA HYDROXY ETHYL HY-
DRAZINE: From Netherland:
Kemwell P. Ltd., 5,000 kgs., Rs.
4,96,609/-.

BRIGHT YELLOW SULPHUR:
From Kuwait: Rashtriya Chemi-
cals & Fertilizers, 2,000 MT.,
Rs. 31,21,587/-; Albright Morar-
ji and Pandit Ltd., 2,000 MT.,
Rs. 30,68,864.

BUTYL GLYCOL: From U.S.A.:
Asian Paints India Ltd., 14.430
MT., Rs. 1,97,535 82.

CALCIUM CYANAMIDE: From
Germany: Gujarat Insecticides
Ltd., 60,000 kgs., Rs. 5,79,358/-.

CAPROLACTAM: From Ne-
therlands: Shree Synthetics Ltd.,
51 MT., Rs. 12,51,455/-.

CARBON BLACK: From Aus-
tralia: Rainbow Ink and Varnish
Mfg. Co., 10 MT., Rs. 66,994;
From Thailand: Ceat Tyres of In-
dia Ltd., 91.600 MT., 7,29,263;
From Japan: Goodlass Nerolac
Paints Ltd., 650 kgs., Rs.
35,957.

CARBON BLACK (GRADE
N330): From Thailand: PIX Tra-
nsmissions P. Ltd., 20,000 kgs.,
Rs. 1,35,039.

CARBON BLACK (GRADE
HAFSL N326): From Australia:
J.K. Industries Ltd., 24,000 kgs.,
Rs. 1,49,077.

CETYL ALCOHOL C16: From
UK: Metro Exporters P. Ltd., 740
kgs., Rs. 20,402; From Germany:
Tata Exports Ltd., 760 kgs., Rs.
20,954.

2 - CHLORO- 2 - 6 -DIETHYL-
N-ACETANILIDE: From USA:

Monsanto Chemo India Ltd.,
1,04,760 ltrs., Rs. 18,49,770.

COBALT ACETATE: From
USA: The Bombay Dyeing & Ma-
nufacturing Co. Ltd., 6,818 kgs.,
Rs. 4,41,834.

CRUDE NAPHTHALENE: From
Canada: Colour Chem Ltd.,
32,000 kgs., Rs. 2,03,972; From
Bulgaria: Yuji Chem Industry,
33,778 kgs., Rs. 1,99,567.

CRUDE SODIUM BORATE:
From Turkey: Indo Borax and
Chemicals Ltd., 100 mt., Rs.
40,925; 100 mt., Rs. 40,925;
From Turkey: Borax Chemicals,
1,00,000 kgs., Rs. 4,38,636.

CYCLOHEXANONE: From Chi-
na: Hindustan Ciba-Geigy Ltd.,
6.84 mt., Rs. 88,805.40; From
Germany: Garware Plastics and
Polyester Ltd., 36,000 kgs., Rs.
5,60,876.29.

1-3, DIBROMO-5, 5-DIMETH-
YL HYDANTOIN: From UK:
Glindia Ltd., 500 kgs., Rs. 74,-
880.

1-6-DIAMINO ANTHRAQUIN-
ONE: From UK: Colour Chem
Ltd., 1,264 kgs., Rs. 7,61,422.

DIETHYLENE GLYCOL: From
Taiwan: Gadani Industries, 9,450
kgs., Rs. 63,806.

2, 6 DIETHYL ANILINE: From
Switzerland: Siris India Ltd.,
14.82 mt., Rs. 4,04,296.

DIETHYL SULPHATE: From
Japan: Supreme Sales Corpn.,
3,276 kgs., Rs. 55,029.

DIHYDROMYRCENOL: From
UK: The Tata Oil Mills Co. Ltd.,
360 kgs., Rs. 61,897.

DIMETHIONINE: From Fran-
ce: Bombay Pharma Proudcts,
5,000 kgs., Rs. 1,98,587.

DIMETHYL CYCLOPROPANE
CARBOXYLIC ACID METHYL
ESTER: From Japan: Rallis (I)
Ltd., 1 mt., Rs. 4,54,414.

DIMETHYL CARBONATE :
From France: Jay organics Ltd.,
6,000 kgs., Rs. 1,44,694.

DIMETHYL DICHLOROSILANE: From Germany: Ampic Pharmaceuticals P. Ltd., 1,050 kgs., Rs. 40,115.

DIMETHYL FORMAMIDE: From Germany: Ranbaxy Laboratories Ltd., 14,820 kgs., Rs. 1,82,791.

DIMETHYL OCTANOL: From UK: The Tata Oil Mills Co. Ltd., 1,955.91 kgs., Rs. 2,03,152.

DIMETHYL SULPHOXIDE: From USA: Nit Pharma & Chemicals, 500 kgs., Rs. 1,14,253; From USA: Zora Pharma P. Ltd., 2,041 kgs., Rs. 46,740.

DIMETHYL FORMAMIDE: From Germany: Southern Seafoods P. Ltd., 4,940 kgs., Rs. 60,930; 4,940 kgs., Rs. 60,930.

DIMETHYL SULPHOXIDE: From Japan: Parag Pharmaceuticals (India) P. Ltd., 1,100 kgs., Rs. 26,421.

DIMETHYL TEREPHTHALATE: From Germany: Garware Nylons Ltd., 1,99,800 kgs., Rs. 16,82,087.

DIOCTYL PHTHALATE: From Germany: Consumers Plastics P. Ltd., 4,242 kgs., Rs. 68,678; Lagh Capacitors, 8,000 kgs., Rs. 87,378; From Japan: Ultra Electronics, 8,000 kgs., Rs. 87,690.

DEHYDROMYRCENOL: From UK: Goldensun Labs., 2,000 kgs., Rs. 2,05,988.

DIPHENYL METHANE DIISOCYANATE: From Germany: Greaves Foseco Ltd., 18,000 kgs., Rs. 5,02,451; 18,000 kgs., Rs. 5,02,451.

DIPHENYL OXIDE: From China: Hind Chemical Industries, 10,000 kgs., Rs. 1,83,063; Nirma Chemical Works P. Ltd., 48,000 kgs., Rs. 9,65,954.

DL. MALIC ACID: From Japan: Grauer and Weil India Ltd., 500 kgs., Rs. 17,615.

EPICHLOROHYDRIN: From Japan: Excel Industries Ltd., 15,840 mt., Rs. 3,49,613.

ETHYLENE BRASSYLATE SPECIAL: From Japan: Hindustan Lever Ltd., 200 kgs., Rs. 1,19,750.

ETHYL GLYCOL: From Germany: Asian Paints India Ltd., 15,288 kgs., Rs. 2,29,202.54.

ETHYL HEXYL ACRYLATE: From Germany: Keytuo Chemicals Ltd., 5,400 kgs., Rs. 1,04,464.

ETHYLMERCAPTAN: From Netherlands: Pesticides India, 12,480 kgs., Rs. 2,34,297; Cyanamid India Ltd., 19,000 kgs., Rs. 4,04,157.62.

ETHOXY METHYLENE MALONIC ACID ESTER: From Germany: Sharvani Pharmaceuticals Ltd., 1,600 kgs., Rs. 2,47,837.

FERRIC AMMONIUM EDTA 50% SOLUTION: From UK: Agfa Gevaert India Ltd., 3,000 kgs., Rs. 90,580.

GLYCERINE 99% MIN.: From Pakistan: Dr. Beck & Co. (I) Ltd., 51,000 kgs., Rs. 8,82,456.

GUM ARABIC: From Mali: Panalal Lilachand & Co., 19,010 kgs., Rs. 1,48,788.

GUM ROSIN: From China: Shri Datta SSS K Ltd., 18 mt., Rs. 1,14,512; The Simplex Mills P. Ltd., 17.55 MT., Rs. 1,16,207; From Germany: The Shirke Paper Mills P. Ltd., 18 mt., Rs. 1,31,648; From China: Arsi Industries, 17,550 kgs., Rs. 1,13,927.98.

GUM ROSIN N GRADE: From China: Bhaswati Enterprises, 17,550 kgs., Rs. 1,13,927.98; From U.A.E.: Panchsheel Paper Mills Ltd., 36,000 kgs., Rs. 2,64,518.

GUM ROSIN WW GRADE: From Hong Kong: Caprihans India Ltd., 16,875 kgs., Rs. 1,16,831; From Indonesia: Hindustan

Lever Ltd., 108 mt., Rs. 7,08,106; From China: Shree Vindhya Paper Mills Ltd., 34.96 mt., Rs. 2,17,869; D.S.V. Chemicals Pvt. Ltd., 16,650 kgs., Rs. 1,13,490; Indo Paints, 16.65 mt., Rs. 1,13,490; From Indonesia: JBA Printing Inks Ltd., 18,000 kgs., Rs. 1,19,186.

HELIOTROPIN: From Japan: Naarden India Ltd., 210 kgs., Rs. 65,436; Calcutta Perfumery Works P. Ltd., 300 kgs., Rs. 93,479.

HMS LACTOSE: From Netherlands: K. Seventilal & Co., 17,500 kgs., Rs. 2,04,484.

HYDROQUINONE (PHOTO GRADE): From Japan: Ramniklal S. Gosalia: 3,525 kgs., Rs. 1,51,027.

IODINE CRUDE: From Belgium: G. Amphray Laboratories, 14,600 kgs., Rs. 33,64,609; From Japan: Mehta Wire & Metal Industries P. Ltd., 1,520 kgs., Rs. 3,72,285.

ISO BORNYL METHOXY CYCLOHEXANOL: From Japan: Calcutta Perfumery Works Pvt. Ltd., 500 kgs., Rs. 70,109; Alka Chem Cosmetics, 500 kgs., Rs. 70,109.

ISOBUTANOL: From Netherlands: New Synth Chem Industries, 46,800 kgs., Rs. 2,92,766; From Germany: Lubrizol India Ltd., 248.704 mt., Rs. 16,54,983; From UK: Aray Enterprises, 6,396 kgs., Rs. 55,377.

ISOBUTYL BENZYL CARBINOL: From Netherlands: Naarden India Ltd., 50 kgs., Rs. 87,546.

ISOCYANATE: From UK: IVP Ltd., 18,000 kgs., Rs. 4,78,266; From Germany: Super Urecoat Industries P. Ltd., 3,000 kgs., Rs. 50,804; Autofil P. Ltd., 6,000 kgs., Rs. 2,47,043.

ISOPHTHALIC ACID: From Japan: Dr. Beck & Co. (I) Ltd., 7,000 kgs., Rs. 93,609.

LINALOOL: From Switzerland: Hindustan Lever Ltd., 8,000 kgs., Rs. 938,052.

LINALYL ACETATE: From Switzerland: Hindustan Lever Ltd., 5,500 kgs., Rs. 7,33,482.

LYLENOL RESIN GRADE: From Japan: Dr. Beck & Co. Ltd., 16,000 kgs., Rs. 2,18,119.

MAGNESIUM OXIDE: From USA: Indag Rubber Ltd., 100 lbs., Rs. 7,662.

MAGNESIUM OXIDE LIGHT: From Japan: Geoffrey Manners & Co. Ltd., 1,500 kgs., Rs. 58,619.

MALEIC ANHYDRIDE: From Germany: Khatau Junker Ltd., 15,600 mt., Rs. 2,34,945.

META XYLIDINE ORTHO SULPHONIC ACID: From Japan: Formokem India Corporation, 500 kgs., Rs. 78,086.

METHACRYLIC ACID: From USA: Chemicals & Plastics Ltd., 1,800 lbs., Rs. 28,534; From Japan: Ion Exchange (India) Ltd., 5.07 mts., Rs. 1,35,912.

METHIONINE HYDROXY ANILINE: From USA: Tetragon Chemie P. Ltd., 3,016 kgs., Rs. 95,844.

METHYL CAPRINATE: From Japan: Naarden India Ltd., 5 kgs., Rs. 1,483.

METHYL CELLULOSE 450: From UK: Southern Seafoods P. Ltd., 1,000 kgs., Rs. 77,295.61.

N-CYCLOHEXYL THIOPHTHALIMIDE: From UK: Goodyear India Ltd., 1,000 kgs., Rs. 93,479.

N-METHYL ANILINE: From Japan: Goodlass Nerolac Paints Ltd., 1,000 kgs., Rs. 1,08,427.

NALIDIXIC ACID: From UK: Win Medicane Ltd., 800 kgs., Rs. 7,03,269.

5-NITRO - 2 - FURFURALDEHYDE DIACETATE: From Netherlands: Kemwell P. Ltd., 10,000 kgs., Rs. 4,18,060.

NOVALDIAMINE: From Germany: Shanavani Pharmaceuti-

cals Ltd., 990 kgs., Rs. 3,02,269.

PARA CUMIDINE: From Germany: Hoechst India Ltd., 29,980 kgs., Rs. 17,04,236.

PARA CHLORO TOLUENE: From Japan: P. G. Chemicals P. Ltd., 1,000 kgs., Rs. 32,436.

PARA CHLORO TOLUENE PURE: From Germany: Searle India Ltd., 14,400 kgs., Rs. 4,22,392.

P A R A FORMALDEHYDE: From Spain: Caprihans India Ltd., 18,000 kgs., Rs. 95,322.

PARA FORMALDEHYDE 96% FRILLS: From Spain: Thermax P. Ltd., 8,000 kgs., Rs. 48,817; From Spain: Pharma Medicines Mfg. Co., 6 mt., Rs. 30,381; Anchemo Ltd., 6 mt., Rs. 30,381.

PARA NITRO CHLORO BENZENE: From USA: Triochem Products Ltd., 16,973 mt., Rs. 2,47,910; 38,606 kgs., Rs. 5,63,585.

PARA TERTIARY BUTYL PHENOL: From Japan: Indian Plastics Ltd., 2,000 kgs., Rs. 33,756.

PERCHLOROETHYLENE: From Germany: Fibrochem Industries, 9,900 kgs., Rs. 69,409; From Belgium: Anshul Chemicals Pvt. Ltd., 20,460 kgs., Rs. 1,49,259.

PETROLEUM JELLY: From UK: Indian Shaving Products Ltd., 200 kgs., Rs. 10,073.

P-PHENYL ALLYL ETHANE: From Japan: Khatau Junker Ltd., 10 mt., Rs. 2,44,924.

POLYVINYL ALCOHOL: From Japan: The Boots Co. (I) Ltd., 500 kgs., Rs. 94,527; Annapurna Laboratories, 1,600 kgs., Rs. 35,314; Punsumi India Ltd., 20 kgs., Rs. 4,857; PDI Chemical P. Ltd., 16,000 kgs., Rs. 3,53,145; From Japan: PDI Chemicals Pvt. Ltd., 1,000 kgs., Rs. 22,071; Vam Organics, 16 mt., Rs. 3,53,144; Kalva Chemicals P. Ltd., 4 mt., Rs. 88,286. From UK: Indian

Petrochemicals Corpn. Ltd., 2 mt., Rs. 1,17,706.

POLYVINYL PYRROLIDONE: From Italy: Bharat Heavy Electricals Ltd., 500 kgs., Rs. 64,392.

POTASSIUM SILICATE: From France: Samtel (India) Ltd., 72,000 kgs., Rs. 4,92,454.

PROPIONIC ACID: From Japan: Calpro, 15,200 kgs., Rs. 1,16,828; From Germany: Industrial Organic Corporation, 16,380 kgs., Rs. 1,93,523; 16,780 kgs., Rs. 1,93,523; From USA: Calpro, 31,680 kgs., Rs. 1,41,793; From Germany: Hico Products Ltd., 16,380 kgs., Rs. 1,93,524.

PROPYLENE TRIMER: From Canada: Ficor Organics Ltd., 2,45,106 kgs., Rs. 20,74,841.

ROCK PHOSPHATE: From Jordan: Rashtriya Chemicals & Fertilizers Ltd., 23,100 kgs., Rs. 1,74,85,548.

ROCK PHOSPHATE IN BULK: From Morocco: Dharamsi Morarji Chemical Co. Ltd., 70,000 kgs., Rs. 51,32,316.

RUBBER CHEMICAL ANTI-OXIDENT 6C: From Japan: Modi Rubber Ltd., 20,000 kgs., Rs. 10,15,556.

SILICONE OIL: From Japan: L. N. Chemical Industries, 400 kgs., Rs. 49,336.

SODIUM HYDROSULPHITE 85% MIN.: From China: G. Amphray Laboratories, 11,880 kgs., Rs. 1,32,429.

SODIUM HYPOPHOSPHITE: From Japan: From Grauer & Weil (I) Ltd., 2,500 kgs., Rs. 1,01,594.

SODIUM SULPHIDE: From Hong Kong: Hiremath Chemicals Ltd., 40 mt., Rs. 1,45,412.

SOYA LECITHIN: From Brazil: A. S. Corporation, 20,000 kgs., Rs. 1,32,429.

STEARYL METHACRYLATE: From France: Indofil Chemicals Ltd., 13,500 kgs., Rs. 4,09,012.

Plastic Materials Imported

SUCCINIC ANHYDRIDE: From Austria: Rallis (I) Ltd., 1,500 kgs., Rs. 89,529.

SULPHUR: From Kuwait: The Dharamsi Morarji Chemicals, 2,000 mt., Rs. 30,66,862.

SULPHUR IN BULK: From Kuwait: The Dharamsi Morarji Chemicals Ltd., 40,00,000 kgs., Rs. 61,84,831; Hindustan Organic Chemicals Ltd., 2,000 mt., Rs. 31,21,587.

SYNTHETIC RESIN ADHESIVE: From Netherlands: Pidilite Industries P. Ltd., 2,31,984 btl., Rs. 8,77,323.

TITANIUM DIOXIDE RUTILE: From Japan: Pidilite Industries P. Ltd., 17,500 kgs., Rs. 4,77,134.

TOLUENE DI ISOCYANATE: From Belgium: Kay Foam Ltd., 18,000 kgs., Rs. 5,02,452; From Germany: Converter Adhesives and Chemicals Ltd., 2,000 kgs., Rs. 55,828.

TRIETHYL AMINE: From Belgium: Armour Chemicals P. Ltd., 3,400 kgs., Rs. 91,597.

TRIETHYLENE GLYCOL: From Singapore: Indian Oil Corporation Ltd., 18.9 mt., Rs. 2,32,032.

TRIMETHYL PHOSPHITE: From Germany: Sudarshan Chemical Industries, 14,400 kgs., Rs. 8,96,353.

TRIMETHYLOL ETHANE: From Japan: Goodlass Nerolac Paints Ltd., 1,860 kgs., Rs. 74,137.

TUNG OIL: From China: JBA Ptg. Inks Ltd., 1,000 mt., Rs. 12,334.

VINYL MONOMER: From Netherlands: Mafatlal Dyes & Chemicals Ltd., 915 kgs., Rs. 19,008.

YELLOW SULPHUR: From Kuwait: Century Textiles and Industries, 1.090mt., Rs. 16,76,780.

ZINC ASH: From Australia: Arat Electro Chemicals P. Ltd., 59.675 mt., Rs. 3,38,648.

BOMBAY

(From 18.1.88 to 19.1.88)
(Cost of Imported Items is CIF Value)

CAPROLACTAM: From Belgium: Garware Nylons Ltd., 1,77,500 kgs., Rs. 43,55,555; The Baroda Rayon Corporation Ltd., 350 MT., Rs. 85,88,418; From Italy: The Baroda Rayon Corporation Ltd., 360.800 mt., Rs. 88,53,432.

EMULSIFIABLE POLYETHYLENE H1-WAX-E: From Japan: Lalbhai Exports Ltd., 1,000 kgs., Rs. 21,183.

EPOXY RESIN: From U.K.: Bakelite Hylam Ltd., 3,150 kgs., Rs. 1,75,529.

HIGH DENSITY POLYETHYLENE: From Yugoslavia: Panorama Plastics, 50 mts., Rs. 5,34,256.

HIGH DENSITY POLYETHYLENE GRANULES GRADE LADENE M 80064: From Saudi Arabia: Universal Luggage Manufacturing Co. Ltd. 24. 750 mts., Rs. 2,89,201,82.

HIGH DENSITY POLYETHYLENE HIPLEX GRADE HHM. 5502: From Yugoslavia: Panorama Plastics, 50 mts., Rs. 5,34,256.

HIGH DENSITY POLYETHYLENE LADENE M 80064: From Saudi Arabia: Heb Lugg Industries Ltd., 24. 750 Mts., Rs. 3,05,268.60.

HIGH DENSITY POLYETHYLENE MOULDING POWDER: From Japan: Jagdamba Polymers Ltd., 25,000 kgs., Rs. 3,02,302; Star plastics, 60 mt., Rs. 7,31,562.

HIGH DENSITY POLYETHYLENE MOULDING POWDER GRADE 5000S: From Japan: Numech Emballage Ltd., 35 mt., Rs. 4,43,290.

HIGH DENSITY POLYETHYLENE MOULDING POWDER GRADE HIZEX 5000: From Japan: Giltpack Ltd., 25 mt., Rs. 3,00,009.

HIGH IMPACT POLYSTYRENE: From Korea: Joshi Formulabs P. Ltd., 17 mt., Rs. 3,20,037.

HIGH IMPACT POLYSTYRENE PLASTIC MOULDING POWDER GRADE HI-60 HR: From Korea: Calcom Electronics P. Ltd., 51,000 kgs., Rs. 9,60,111.

HYDROXY ETHYL CELLULOSE: From Netherlands: Asian Paints India Ltd., 1,000 kgs., Rs. 48,038.01.

LOW DENSITY POLYETHYLENE BLACK COMPOUND: From Finland: Upcom Cables Ltd., 16,000 kgs., Rs. 2,37,253.

PARA ISOPROPYL BENZALDEHYDE: From Japan: Beeta Chemicals, 50 kgs., Rs. 20,773.19.

PARA OCTYL PHENOL: From Japan: Indian Plastics Ltd., 6,000 kgs., Rs. 1,01,269.

POLYACETAL MOULDING POWDER: From USA: Polyolefins Industries Ltd., 32 mt., Rs. 8,51,701.

POLYCARBONATE MOULDING POWDER: From Germany: Peico Electronics and Electricals Ltd., 900 kgs., Rs. 64,019; Jyoti Plastic Works, 13,860 kgs., Rs. 4,93,057.

POLYETHER POLYOL: From Belgium: Dura Foam Industries P. Ltd., 16.775 mt., Rs. 1,86,912.

POLYPROPYLENE: From UK: Shri Rajshri Plastics, 16 mt., Rs. 2,52,765.

POLYPROPYLENE MOULDING POWDER: From Singapore: Narendra Polyplast, 16 mt., Rs. 2,84,592.77.

POLYPROPYLENE (NOVOL-EN 1100 NX): From Germany: Steriware P. Ltd., 14 mt., Rs. 2,40,464.

POLYTETRA FLUORO ETHYLENE RESIN: From Italy: Plastic Products Engineering Co., 2,500 kgs., Rs. 2,98,615.

POLYETHYLENE MOULDING POWDER HMA 016: From Saudi Arabia: Premier Plastic and Chemical Age, 17,150 kgs., Rs. 2,10,416.

POLYURETHANE RESIN: From Japan: Arvind Atul & Co., 200 kgs., Rs. 6,254.11; From Belgium: Jai Industries, 15,480 kgs., Rs. 1,76,863.

POLYVINYL CHLORIDE: From Yugoslavia: Ajay Industrial Corporation, 2,00,000 kgs., Rs. 23,50,751; From Mexico: Streamflow Plastics P. Ltd., 50 mt., Rs. 6,32,750.

POLYVINYL CHLORIDE RESIN HOMOPOLYMER: From Mexico: Rigidor Plastics P. Ltd., 100 mt., Rs. 11,56,597.82.

PVC RESIN: From Korea: AMC

Coated Fabrics P. Ltd., 25 mt., Rs. 3,77,748.

PVC RESIN SUSPENSION GRADE: From Korea: The Supreme Industries Ltd., 9.2 MT., Rs. 1,34,206.

PVC RESIN SUSPENSION GRADE K: From Korea: The Supreme Industries Ltd., 10 mt., Rs. 1,34,206.

PVC RESIN SUSPENSION GRADE S. 5167: From Hungary: Paharpur Cooling Towers P. Ltd., 142.5 mt., Rs. 17,99,904.

SYNTHETIC RESINS: From USA: Poonam Plastic Industries, 40 mt., Rs. 1,97,346; 20 mt., Rs. 98,673.

DRUGS MATERIALS IMPORTED BOMBAY

(From 18.1.88 to 19.1.88)
(Cost of Imported Item is CIF Value)

CALCIUM PANTOTHENATE: From Germany: Ashok Pharmaceuticals, 1,000 kgs., Rs. 76,922.

CALCIUM - D - PANTOTHENATE: From UK: Roche Products Ltd., 300 kgs., Rs. 53,619.

D CALCIUM PANTOTHENATE USP: From Japan: Tata Exports Ltd., 500 kgs., Rs. 89,364.

(D) + TARTARIC ACID BP/USP: From Argentina: Lupin Laboratories P. Ltd., 36 mt., Rs. 12,51,562.

DL 2 AMINO BUTANOL: From Germany: Lupin Laboratories Ltd., 45,630 kgs., Rs. 41,83,051.

GLYCERINE 99.5% BP/USP: From Germany: Colgate Palmolive India Ltd., 83,200 kgs., Rs. 15,65,219.

INDOMETHACIN BP: From Hong Kong: Bombay Pharma Products, 250 kgs., Rs. 76,125.

LACTOSE MESH IMPALPABLE: USP From Netherlands: John Trading Corporation, 14,0000 kgs., Rs. 1,69,665.

LEVAMISOLE HCL BP 80:: From China: Paramount Drug House, 100 kgs., Rs. 52,957.

METRO NID/DAZOLE BP 80: From China: H. N. Dychem Industries P. Ltd., 825 kgs., Rs. 1,85,679.

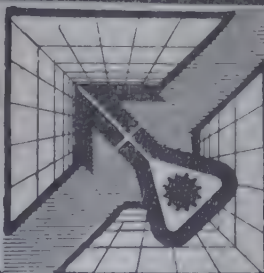
TARTARIC ACID BP: From France: Bombay Pharma Products, 7,000 kgs., Rs. 3,01,668.

D. L. MANDELIC ACID: From Japan: Selectrochem, 1,500 kgs., Rs. 1,48,941.

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NO. 36

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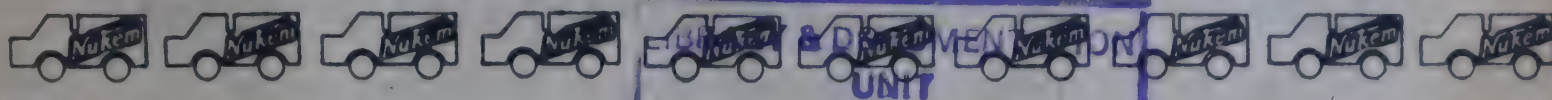


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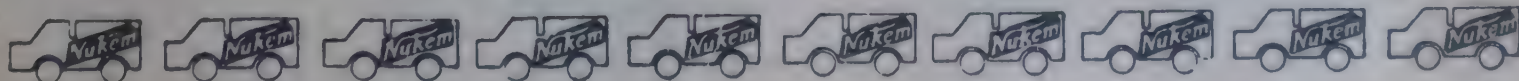
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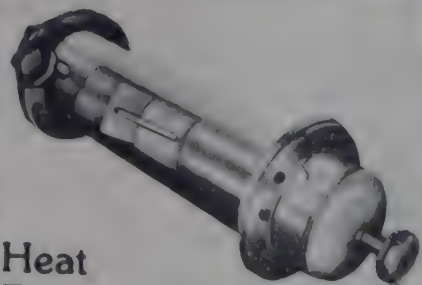
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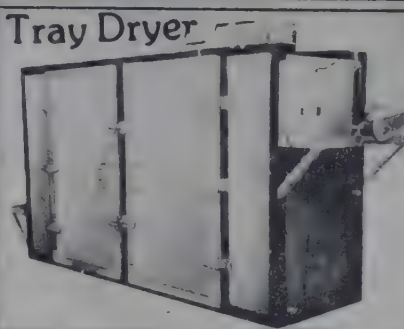
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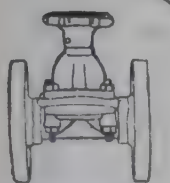
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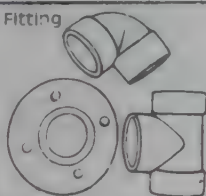


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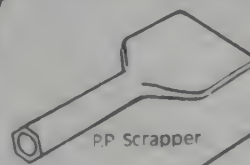
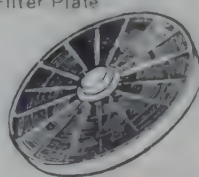


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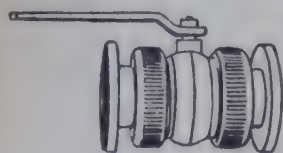
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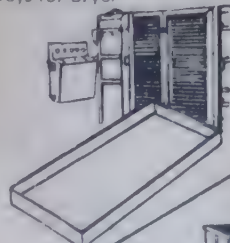
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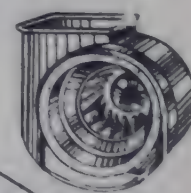


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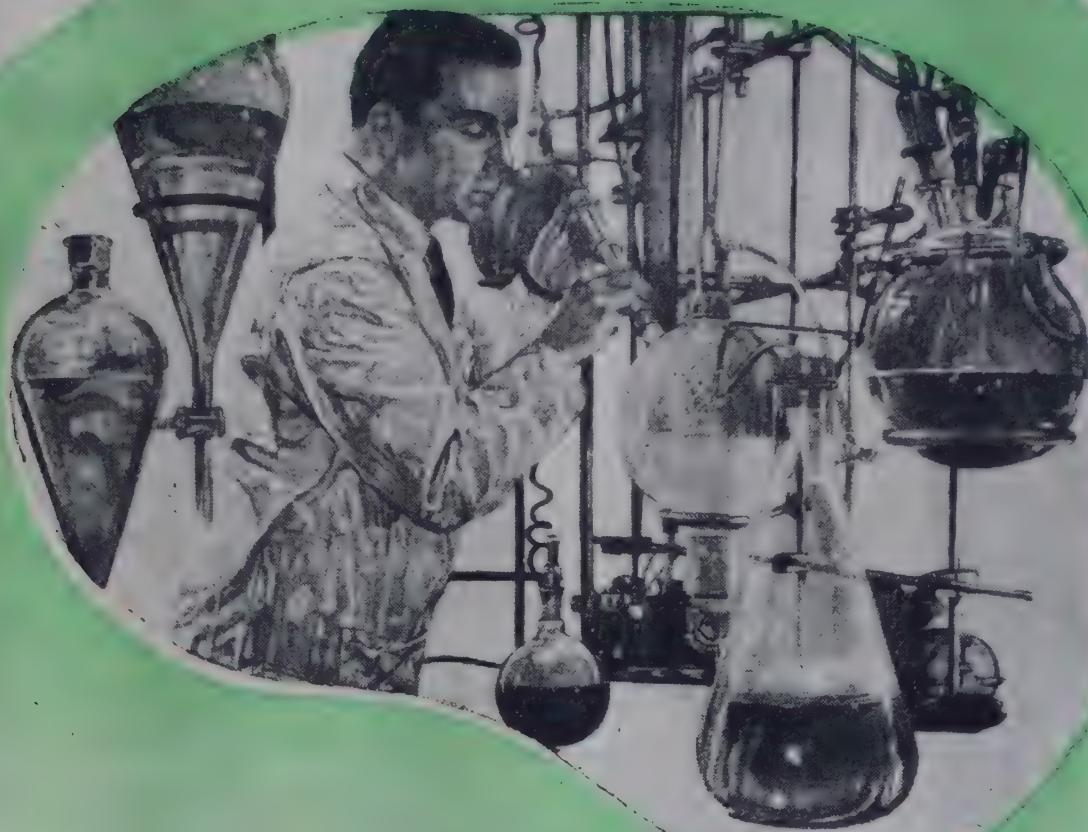
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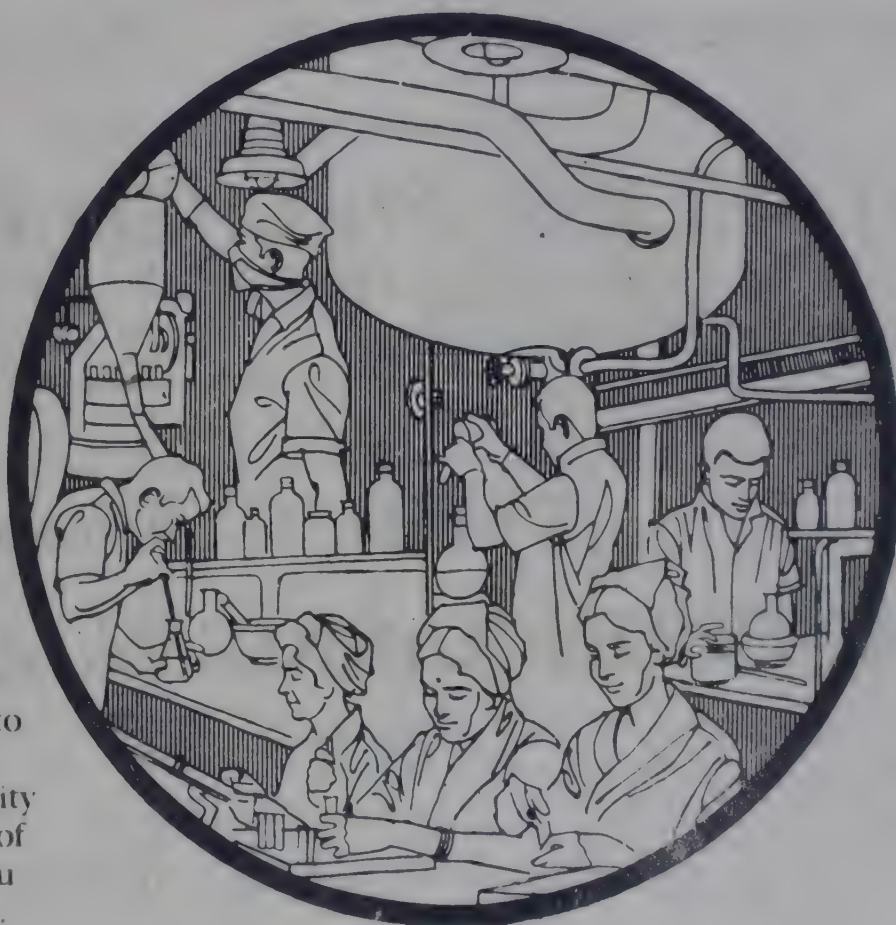
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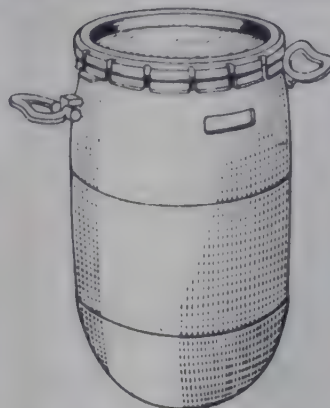
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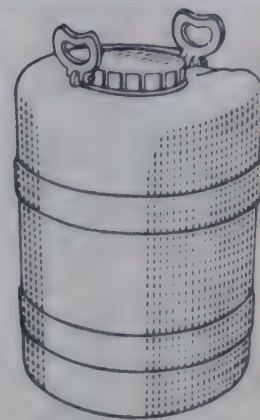
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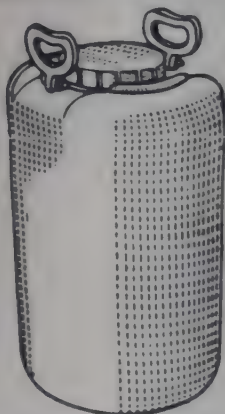
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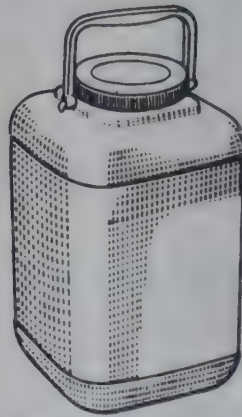
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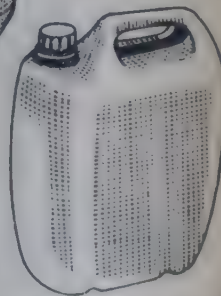
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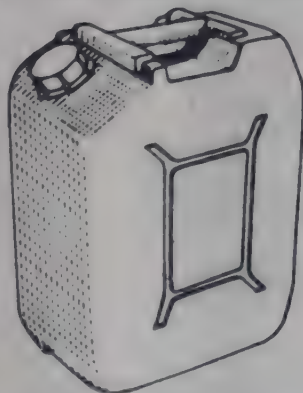
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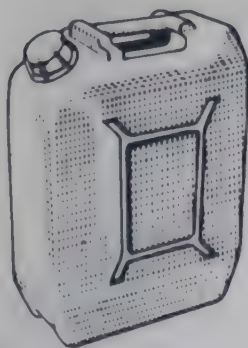
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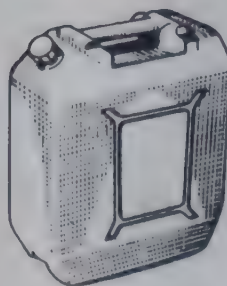
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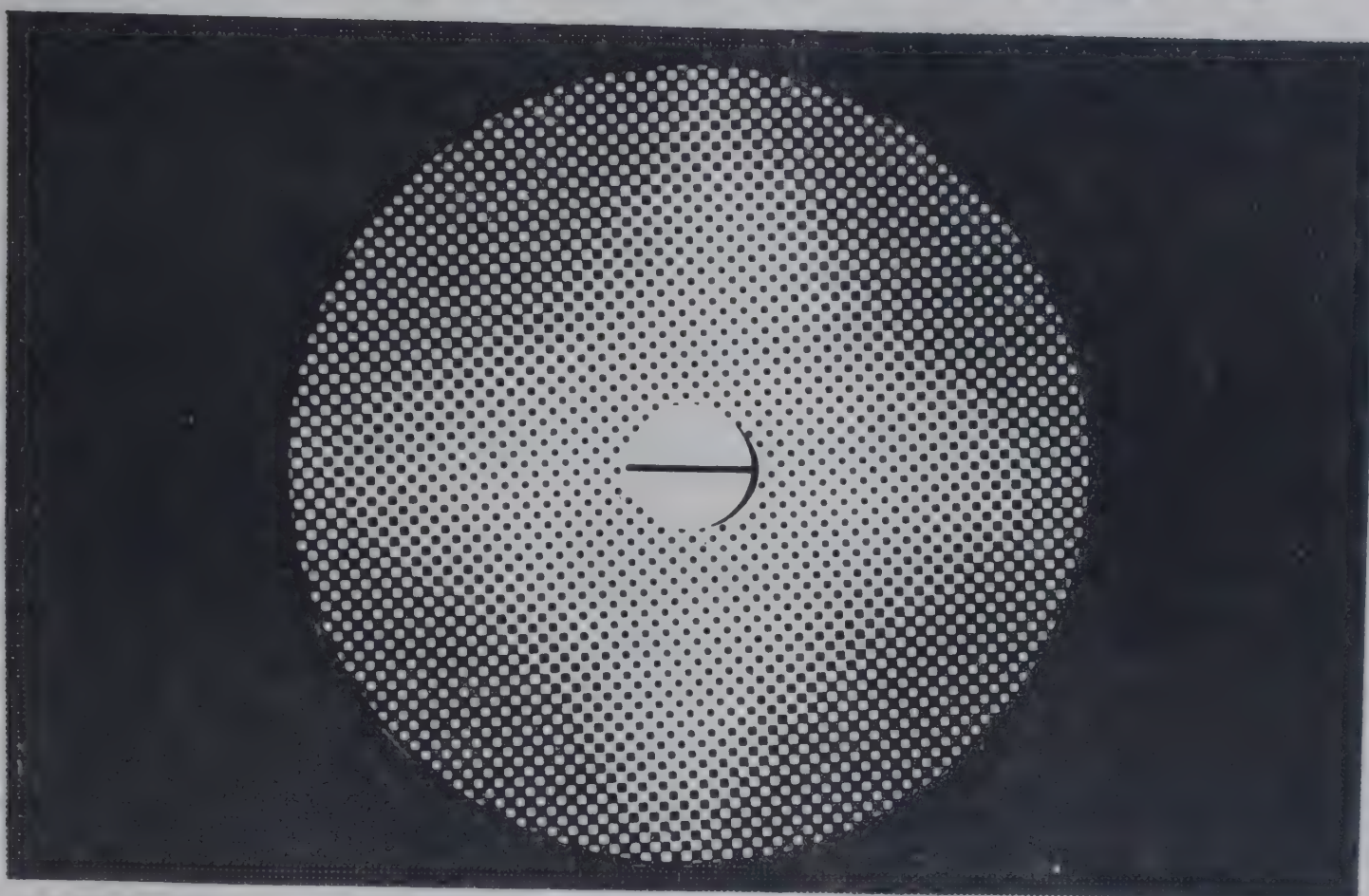
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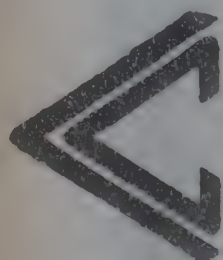
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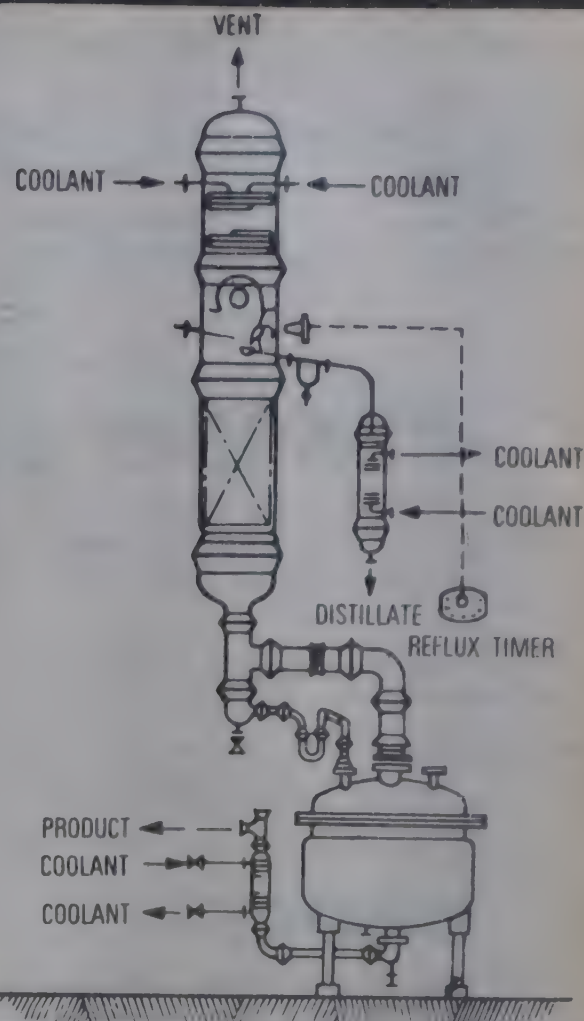
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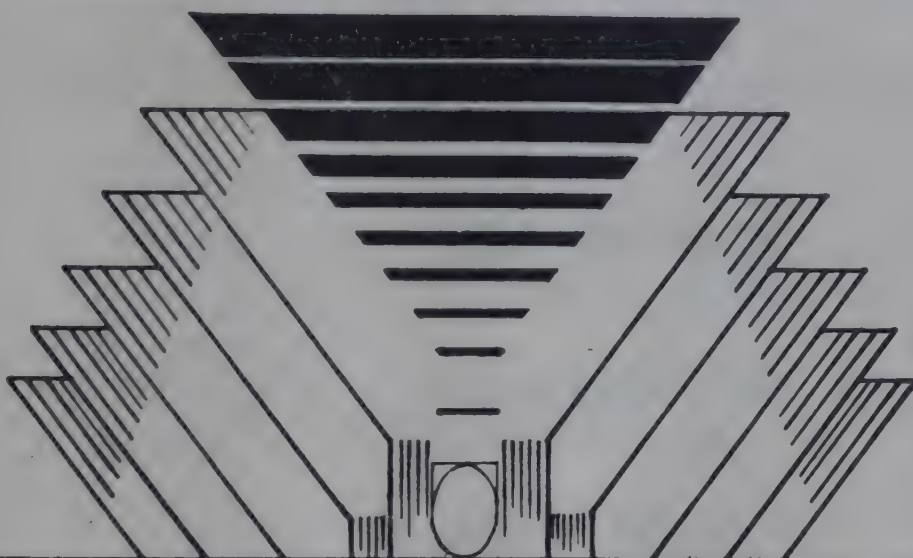
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Biotechnology and the Challenges on the Food Front

Food security is one of the most persistent and central global problems. World food production must double in the next 40-80 years, depending on the rate of population growth. In 1975 when the world population was 4 billion, 3.3 million tonnes of food were produced. If the population grows at the annual rate of 2 percent, the 8 billion people in the year 2015, will require 6.5 billion tonnes of food. Two thirds to three fourths of this increased requirement must come from intensified production on existing land and the rest from bringing new marginal lands into production. Both these tasks will require new and appropriate technology. Recent developments in biotechnology, including recombinant DNA procedures, have been described as revolutionary in view of their anticipated global impact in the areas of health, agriculture, energy, environment and other social and economic impacts.

The inter-relation between energy and food production, often tends to get overlooked. The energy intensiveness of green revolution based agricultural technology poses a major dilemma to the developing and underdeveloped countries of the world. The dilemma is very real even to highly advanced states of the world which are having food surplus for export and at the same time have no problems of energy shortage. One may be surprised to learn that the annual per capita food production in the United States requires the BTU equivalent of 112 gallons of gasoline or 336 gallons if processing, distribution and home or restaurant preparation are added. If all petroleum reserves were used solely to feed the world population using the US agricultural methods, total known reserves would last only 12 years and estimated potential reserves would be used up in about half a century.

It is in this context that the agriculture oriented biotechnology transfer which is not energy intensive assumes enormous importance. Hunger and malnutrition affect as many as one billion people, inhabiting the countries of the third world. One of the most vital applications of new genetic engineering will be in the area of human and animal feeding. Most societies have used various microbial processes, for example, fermentation for food preservation for centuries, hundreds of new technologies are on hand today. It is now possible to create meat flavoured food, through vegetable fermentations and more importantly single cell protein (SCP). The production of SCP on a massive scale should provide a new food source for tens or even hundreds of million people. SCP at the

same time could compete with Soyabeans and offer traditional crops that are abundant, cheap and widely used as animal feed. Wide spread production of SCP by third world nations could alleviate some of the economic, political and humanitarian problems linked to hunger and malnutrition. Improved textured Soya beans for cereals, meat substitutes and dairy substitutes are already playing a growing role in human diets.

Microbiology has an enormous potential in terms of increasing efficiency and yield in conventional crop production. Possible applications include improved recycling of soil minerals by microorganisms, bacterial inoculation of plants, the use of microbial fungi to increase plant's nutrients and improved water intake, the biological control of pathogens and nitrogen fixation. Currently, it is estimated that 30% of nitrogen used in world agriculture is derived from petroleum based fertilisers. The utilisation of microorganisms in lieu of chemicals for nitrogen fixation would have enormous impact on petroleum use in both developed and underdeveloped countries. The United States is most likely to be in the forefront of nitrogen revolution. It will require all the foresight and wisdom on the part of the rich and poor nations of the world to adjust to the new situation arising from reduced fertiliser sales. The third world is at once a genetic store house and a giant field laboratory. Thus, opportunities for cooperation between the rich and poor nations will be unlimited. In effect the nitrogen fixation could pick up where the green revolution let off.

Another promising objective for biogenetics is the development of microbial insect control agents. These agents produce little or no human or environmental dangers although no one can guarantee absolute safety. Here again there is a vast area for cooperative testing and development in the less developed countries. As in the case of nitrogen fixation, success in the area will lead to lower demands for the petroleum products used in chemical pesticide. Plant cell and tissue culture will offer benefits to the rich and poor nations alike. This technique allows the manipulations of cells in a variety of chemical and physical environments, causing them to clone and later regenerate on a massive scale whole-plants with improved characteristics. Sixty nine countries now belong to the International association for plant culture including 40 in Africa, Latin America and Asia. Plant cell and tissue culture, thanks to the germ plasm resources held by the LDCs, is also an area

where the application of biotechnology to international development programmes is likely to provide mutual benefits to the developed and developing states. These methods also can provide a bridge between molecular genetic engineering and conventional plant breeding and thus provide avenues for meeting global food requirements.

Animal production is another area where technology transfer can benefit the mankind as a whole. Animals produce high quality protein for human diets, provide traction for agriculture and manure for fertiliser, solid fuel and biogas. Worldwide animal products contribute over 56 million tonnes of edible protein and one billion megacalories of energy annually. The protein is equivalent to more than half of that produced from all cereals. Biotechnology has application in animal breeding, health and nutrition. Specifics include sex regulation, harvesting multiple female gametes from a single ovary, cloning genetically identical animals, inducing unisex parentage and transferring embryos between species. Artificial insemination and frozen embryo transfer are common practices today and provide rapid means for improving the genetic quality of animals in the less developed countries. Embryo transfer is already a \$20 million industry in the United States alone.

A study conducted by the National Academy of Sciences (1982) concludes that the less developed countries are pinning their hopes on the biotechnology revolution. Increased food production is one of the basic development goals of most third world countries and biotechnology is seen as a cost saving and rapid means of achieving what has proved difficult and perhaps impossible by conventional means. However, since much of the research conducted thus far has taken place in developed countries, problems concerning less developed countries are not receiving the attention they deserve. There is an urgent need for studying the economic implications of biotechnology and devise appropriate channels and institutions built for the transfer of technology from the affluent to the poor nations.

The rationale for agricultural technology transfer to the poorer nations is beyond question. What remains unanswered are the many vexatious questions as to which technologies are economically, socially and environmentally appropriate and the financial terms for effecting such transfers. Hopkins and Puchala, two renowned workers in this field, have noted with regret that little effort has been made to undertake new types of research that could lead to changed government priorities or to cultural or social changes. They recommend "that agricultural science and technology should be viewed as collective goods developed for the benefit of mankind. Information about agricultural conditions in any nation must be available to all the nations, since the orderly evolution of markets and development plans depend critically on such information".

It is an unfortunate fact that dialogue between the rich and poor are hindered by differing perceptions and interpretations, by the realities of world economic system and by the sheer dimensions of the system for feeding the billions that inhabit the globe. Experience from the green revolution has shown that the technology of agriculturally advanced nations such as the United States are not well suited to either the resources or adaptive abilities of the

typical less advanced countries. It is to be remembered that of the progenitors of the green revolution Dr. Borlaugh described it only as a holding operation, implicately destined to be replaced by secondary or tertiary revolution more specially suited to the Third World needs.

Agricultural technology transfer is one of the key issues of the mid-eighties and is likely to remain so in the decades to come in the virtue of the world population expansion and the persistent problems of unequal regional growth in food productivity and/or purchasing power; lagging food production and maldistribution are of equal concern to the neo-Malthusians who are constantly worried about recurring food crisis, distributionists disturbed by income disparities and social injustices and to the producers whose consolation is to sidestep the maldistribution problem through enhanced food output.

The global agricultural system consists of many groups with varying interests, each having a unique and individualist view of the system in general and of technology in particular. The general humanitarian looks at the problem as one of alleviating human suffering, the producer looks at it in terms of potential profits and better prospects of facing foreign competition, the foreign policy community hopes to get political leverage abroad and ensure LDC social instabilities. The pure agricultural scientist looks upon the third world as a laboratory, as a proving ground or research partner. The political and economic benefits from the transfer of technology and political and economic impacts on the recipient nation cannot be neatly balanced but must be assessed across a broad spectrum. Agricultural technology transfer does not represent a gift or donation from rich to the poor nor does it represent something that must be wrested by the poor nation from the advanced nation as an atonement for the earlier sins of exploitation.

The lag in rural development in much of the third world is attributable to the intentional neglect of the agricultural sector in favour of urban/industrial expansion, unresolved conflicts in development priorities and shortages of human, physical and financial resources. It is an unfortunate fact that most of the less developed countries have become hostages to their growing urban population which could become politically dangerous without subsidized food.

This raises the fundamental question whether import of technology to a LDC is in fact central or peripheral to rural development in that country. Lester Brown holds the view that "exciting advances" in food production may never materialise in LDCs. H. Wood, another international authority on World's food resources, says that LDC food production has become limited by a host of factors — uneconomic holding, low soil fertility, poor soil structure, poor seed, water shortage, extreme atmospheric temperature and a lack of access to inputs and markets. These veterans hold the view that in the absence of concerted efforts by the LDC to remedy these ills, the import of biotechnology or another miracle may not take root at all in the LDCs. This can only be termed as a pessimistic view. In the march against hunger the LDCs face many challenges. Their success in overcoming these heavy odds could be achieved only by marrying the appropriate technology effort with the introduction of biotechnology.

CHEMARENA

S.L. VENKITESWARAN

Another Superconducting Material

The latest in the galloping areas of superconductors is a material containing thallium, closely in the wake of the material containing bismuth (besides calcium, copper and oxygen) announced a few weeks back. This material was discovered at the University of Arkansas's Physics Department and also contains calcium, barium, copper and oxygen. It is claimed to start conducting at 125K and achieves zero resistance at 107K. Their announcement just four or five weeks ago has been confirmed at several of the major centres of research on superconductivity. IBM have claimed to have prepared such a material of zero resistance at 125K and of composition Tl-Ca-Ba-Cu-O.

Crystallography studies on all such materials is going on and the Arkansas material is being studied at the Geophysical laboratories of Washington D.C. The superconducting phase is said to be $Tl_2 Ca Ba_2 Cu_2 O_{8-x}$ in which x is less than 1. IBM's team is said to have used a different method and got two phases of which the 2-1-2-2 phase had transition temperature 108K while a 2-2-2-3 phase had 125K (oxygen atom is not included in the above).

It is reported that the structures are different from the 1-2-3 group of yttrium-copper-ceramics $Y Ba_2 Cu_3 O_7$. It is similar in structure to the bismuth containing mater-

ials. It is also said that there are no copper-oxygen chains as with yttrium but probably copper-oxygen planes. There is as yet no theory or explanation of the superconductivity and perhaps adhoc studies may throw up more compositions with the core of copper and oxygen. To make this it is said that a barium copper oxide $Ba Cu_3 O_4$ and thallium oxide and calcium oxide were ground and pelletised and the pellets heated at 900°C for 3 to 5 minutes in flowing oxygen.

No 'annealing' for extended period was necessary for the thallium - copper - ceramics. Are we on the way to more materials of higher temperature superconductivity in the coming months? We are yet to hear of any Indian claims in the recent months. Meanwhile there is an interesting line of work which may have earlier application. General Electric claim to have succeeded in laying down a superconducting ceramic film on silicon substrate and got conductivity at as high as 83K. Silicon is the basic building block of micro chips. Efforts to build a layer of the earlier yttrium material did not succeed because the "annealing" in oxygen disturbed the structure. Now in the new method a buffer layer of heat-resistant zirconium oxide between the silicon substrate and superconducting film has solved this problem as the buffer layer served as an effective diffusion barrier.

Ozone Depletion

The Antarctic "Ozone hole" has already created serious misgivings on the future. While it was felt that it is a temporary feature as the ozone levels gets restored, the data on worldwide ozone levels over a 15 year period show an average 2.5% reduction over past ten years.

TOMS or Total Ozone Mapping Spectrometer data via Nimbus Satellite using Solar Backscatter Ultraviolet Instrument (SBUV) indicated an average fall of 1% per year. Critical examination of the data by a special NASA Committee of the satellite and ground-based data have confirmed these.

The decline is precipitous in the southern hemisphere and not limited to Antarctic. Apparently it is 5% or more at all latitudes south of 60°S throughout the year. In the Northern hemisphere there has been a 8% fall between 1969 and 1988 over Moscow, Dublin and Anchorage. For every 1% decrease in ozone, an additional 2% of the UV radiation reaches the earth's surface -- leading to rise in skin cancer, damage to plant and marine life and later on may affect the climate.

The Montreal Protocol on reduction of CFC's by 50% by 1998 is a significant step but questions may crop up on whether these are adequate on the long term.

New Vaccines

(Ref. Chem. Business, Feb. 1988)

Vaccination of children for DPT -- Diphtheria, Pertussis, Tetanus -- is routine now and is one of the major objectives of India's S&T task force under Mr. Pitroda. The vaccine supply is free at public health centres. Polio and Measles-Rubella-Mumps (MMR) are also effectively tackled by vaccines and some of these are made in India also. In USA, it is mandatory for children to be vaccinated for DPT, Polio and MMR. But it is reported that vaccines which are not compulsorily given to children up to school going age are not readily marketable. Adults generally resist the use of available vaccines against diseases that affect their age group -- influenza, hepatitis, pneumococcal pneumonia, according to Centre for Disease Control, CDC, Atlanta, GA, USA. What are the prospects for effective vaccines against influenza, AIDS, Malaria which are yet to be developed and will have to be administered to adults? May be AIDS has become such a scare that many persons may be inclined to take it or Government may make it mandatory for certain groups. The US industry view is that vaccines are not a profitable area and perhaps this view influences R&D and enormous development costs particularly for biotech products. Vaccines being proteins and with the extremely sophisticated techniques available many proteins can be totally identified and produced through genetic engineering in selected bacteria but the costs until final FDA clearances are colossal.

The sales of vaccines and other biologicals were reported at \$529 mill. or 2.4% of all ethical pharmaceuticals in USA in 1985. The percentage has declined from 3.5% in 1982 as a result of the increases in sales of other pharmaceuticals while vaccines remained practically the same.

Recently Merck have introduced a plasma-based vaccine (Heptavax-B) and a recombinant vaccine (Recombivax HB) to combat Hepatitis B -- the first biotech vaccine to be marketed. The recombinant vaccine is a landmark biotech product and easier to manufacture as against the natural plasma derived product with all the problems of collection, transport, storage, purifying, standardisation etc. of large volumes of plasma. But both are very expensive -- \$120 for a three-shot treatment. Costs of the order of \$100 and above create greater resistance than the age-group disinclination. Hepatitis B vaccine programmes have been undertaken by the Central agency CDC with the cooperation of some public health offices but with poor response. Even the doctors were not much interested for the response was low. CDC concluded that an adult vaccination programme

will not work and renewed efforts can be taken only when prices are cut drastically. Hepatitis B is primarily for the "gay" males or IV drug abusers and some of them may become carriers of the virus with risk to others but that is not enough reason for any compulsion at the present prices. It is reported that plasma-based Hepatitis vaccine in South Korea is available at \$ 1 per dose.

AIDS, the new scourge is the subject of a mammoth billion \$ R&D effort subsidised by the US Government. Many companies are active and it seems a case where only biotechnology can yield results. The first AIDS "Vaccine Candidate" has been approved for testing in August 1987 and was developed by a small company and termed VaxSyn HYV-1. The Phase I trials are to test for safety and optimal dosage in 60 healthy homosexual males and three heterosexuals who test negative for HIV virus. Phase II will extend the testing and Phase III test the effectiveness on preventing infection. It may be the mid 1990's before commercial supplies, if all tests are positive. Meanwhile other products for testing are on line. Here again the commercial viability is doubtful due to resistance from the high risk groups and the high cost.

A vaccine for malaria is not on the horizon. A number of stages of development in the body and effectively tackling all the stages are serious handicaps. Certainly it would be cheaper to use drugs and to combat the source -- mosquito breeding centres -- with measures which are already available at low cost. Some trials on vaccines for the sporozoite form are to be started. A handicap on vaccine sales promotion which has not affected us is the liability of suppliers on claims for injuries. U.S. Government has recently legislated for assistance in liability for mandated vaccines. The claims are to be met from funds created from a surcharge on price of each dose -- \$ 4.56 per dose of PPT and 29 cents on polio. Some manufacturers have their own surcharge for liabilities. Prices have gone up on MMR and other vaccines but it is a mandated programme. Vaccines when most effective tend to whittle down their own markets as in the case of small pox. Now a vaccine for chicken pox is under development and trials. New vaccines are not going to be on the market in the near future and even if marketed the high cost and adult resistance will be deterrent factors. We have a much debated VAP (Vaccine Action Programme) in association with US and perhaps this is to be limited to the administration of available vaccines and wide range testing and no R&D for new vaccines.

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Metkem, IISc developing pilot silane plant

The nascent indigenous silicon industry is breaking new ground, with the private sector Metkem Silicon Ltd. and the Indian Institute of Science teaming together to develop a pilot silane plant.

The effort to fashion the knowhow for producing silane is said to be a step in the direction of developing amorphous silicon, a new-fangled strategic material with significant economic applications. At the same time, silane can also be used as a "new and alternative route" to produce polysilicon within the country.

At present, Metkem Silicon Ltd. — which has pioneered indigenous technology, in conjunction with the Indian Institute of Science, for the production of polysilicon — uses the 'silicon tetrachloride-trichlorosilane route'.

The new pilot plant, now being fabricated at Metkem's works in Tamil Nadu, is expected to be ready in two years. It will have a capacity of 100 kg. silane daily.

This scheme is funded by the Centre through IISc which has already developed a "table-top model," complete with the knowhow, for producing silane. And, the lead time of about two years needed to scale up the "table-top model" to that of a field-level pilot plant is not an unduly long period, according to knowledgeable sources.

Meanwhile, Metkem is understood to have "stabilised" the indigenous technology for the production of polysilicon. This knowhow was often compared with the package offered by Hemlock, a US firm. With the Centre recently deciding to scrap the deal with Hemlock, the indigenous effort to produce polysilicon seems to have received a shot in the arm.

The Prime Minister, Mr. Rajiv Gandhi, himself is believed to have backed a more recent move to give momentum to the native efforts in this frontier area of technology.

It is in this context that work has just begun on a Rs. 1.50-crore two-year project to tune up the production efficiency and improve the technical efficacy of the polysilicon process already developed by Metkem and IISc.

Of the total assistance given by the Union Department of Non-conventional Energy Sources (DNES), grants total

Rs. 1 crore while the remainder Rs. 50 lakhs accrue as soft loans from the Indian Renewable Energy Development Agency, a DNES outfit.

The funds for the pilot-scale silane project are channelled on a separate stream, without reference to this Rs. 1.50-crore package.

FERTILISER INDUSTRY CANCELS ALL HDPE SACK ORDERS

Orders placed on HDPE woven sack manufacturers have all been cancelled by the fertiliser industry following the decision to compulsorily pack used in jute bags. This gives a 75 per cent reservation to jute bag packing as against 50 per cent originally contemplated in the Jute Bags Mandatory Order, according to Mr. Ramesh Jain, President of the All-India Flat Tape Manufacturers Association (AIFTMA).

Mr. Jain stated that the Textile Ministry had pressurised the fertiliser units despite the fact that a number of high courts in the country granted stay orders in the implementation of the mandatory order. The Tamil Nadu High Court has stayed the operation of the Act itself, and it is unfortunate that the Ministry should threaten the fertiliser units with penal action even as the matter is sub-judice.

Stating that the HDPE sacks industry continues to be in doldrums with a restricted domestic market, Mr. Jain said the latest concession offered by the Finance Minister, Mr. Tiwari in the form of reduction in excise on sacks from 12 per cent to eight per cent is "no reduction in the real sense". The so-called reduction in excise worked 25 P per bag and even then a HDPE bag would cost Rs. 8.25 as against Rs. 6.90 per jute bag (fertiliser).

Similarly, an HDPE sack for cement costs Rs. 5.43 now (Rs. 5.60 earlier) as against the jute bag costing Rs. 4.25. Mr. Jain alleged that the excise reduction is deliberately kept low so as to make the HDPE bag costlier vis-a-vis the jute bag.

Mr. Jain stated that the HDPE woven sack units suffer mainly because the excise classification puts the manufacturers of "tape, sacks, fabrics" under the Textiles Ministry, while the

administrative Ministry for them is, in fact, the Ministry of Petroleum and Chemicals. Whenever a suggestion is made by the parent Ministry (Petroleum and Chemicals) the matter is referred needlessly by the Finance Ministry to the Textiles Ministry, which seems to overrule the genuine requirements of the HDPE industry.

Mr. Jain regretted that the latest excise reduction ignores the excise differential between large and small units. Now the difference between the two segments of industry has been narrowed down from seven per cent to three per cent, much to the disadvantage of the small units.

Duty reduction of laminated fabrics from 15 per cent to five per cent is no doubt a step in the right direction, but this should have been fully exempted as in the case of sacks.

Reiterating that in view of the narrowed down domestic market for HDPE sack industry in the country, exports should be encouraged. Mr. Jain said that a target of Rs. 150-200 crores would become possible only if the industry is compensated to the tune of at least 15 per cent of the price. Cash compensatory subsidy at five per cent is not at all remunerative to meet the stiff international competition with China and Thailand enjoying low domestic HDPE/LDPE prices.

PANEL TO REVIEW DRUG PRICE HIKE APPEALS

The Union government has constituted a three-member committee to review applications from drug companies for price increase. The committee headed by Mr. M. S. Murthy, adviser (chemicals) to the department of chemicals and petrochemicals, has been asked to take up price review applications of drug companies in respect of which the Supreme Court had given judgement in May 1987.

The committee will hear review applications and make recommendations on prices of various drugs with effect from January 1, 1984 till January 1, 1987.

The members of the committee are Mr. S. Ramamurthy, adviser (costs), Bureau of Industrial Costs and Prices and Mr. R. N. Tandon, Joint Director (Chemicals) in the Department of Chemicals, will be the convenor of the committee.



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HBJ GAS-BASED FERTILISER PLANTS:

Permission sought for doubling capacity

The three gas-based fertiliser projects along the HBJ pipeline at Guna in Madhya Pradesh, Aonla in Uttar Pradesh and Jagdishpur in UP which are either complete or about to be completed, have applied to the government for doubling of capacity.

A verbal assurance from the Gas Authority of India Limited that it will be possible for it to make available for it to make available additional gas from the South Basin offshore field to the three projects have emboldened the project authorities to seek capacity expansion.

Each of the three projects has presently an annual capacity of 4.45 lakh tonnes of ammonia and 7.26 lakh tonnes of urea. (The capacity should be viewed in terms of urea since ammonia is converted into urea for the purpose of selling to farmers.) Applications seeking letters of intent for doubling of capacity from National Fertilizers Limited for the Guna project, from Indian Farmers Fertilisers Co-operative for the Aonla project and from Indo-Gulf Fertilisers and Chemicals Corporation Ltd. for the Jagdishpur project are being actively considered by the Union government.

The promoters of the three projects are hopeful of getting government sanction since the proposed cumulative capacity expansion of the order of 21.78 lakh tonnes will be effected at a much lower capital cost than setting up three green field site projects. Presently, it is being estimated that a gas based fertiliser project of a capacity of 7.26 lakh tonnes will cost a little over Rs. 760 crores. Mr. B. N. Puranmalka, managing director, Indo-Gulf said that it should be possible for his company to add this capacity to the existing plant at Jagdishpur at a substantially lower capital cost of around Rs. 630 crores. What holds good for Indo-Gulf applies equally to the other two projects.

The reason why the cost of expansion will be substantially lower is that many of the existing facilities like raw water supply system, water treatment plant, urea storage area and the railway system could be used to support the proposed

expanded production. The cost of expansion will mainly relate to the installation of a single stream of ammonia plant of a daily capacity of 1,350 tonnes and two parallel streams of urea plant of a daily capacity of 2,200 tonnes. The expansion, according to Mr. Puranmalka, can be completed in three years.

Besides the cost advantage factor, the decision of the government on the subject is likely to be influenced by certain observations of the study group on new nitrogenous fertiliser plants headed by Dr. Varadarajan. The group has estimated that by the year 1994-95, there will be a shortfall of 51.31 lakh tonnes of nitrogen in the country since the demand then will be 129 lakh tonnes compared with an expected production of 77.69 lakh tonnes.

Of the projected deficit of 51.31 lakh tonnes in 1994-95, the share of northern zone comprising Uttar Pradesh, Punjab and Haryana alone will be 31.06 lakh tonnes of nitrogen since against the projected demand of 51.14 lakh tonnes, the production will be 23.08 lakh tonnes. The only surplus region, according to the group, will be the west.

In the circumstances, the recommendation of the group is that after providing for importing of 10 lakh tonnes for the northern zone and moving the surplus of 5.33 lakh tonnes of western zone to the north, steps should be taken for the setting up of four to five new nitrogenous fertiliser plants (in addition to the proposed plant at Shahjahanpur in UP) each with a capacity of 7.25 lakh tonnes of urea. The group has said that "the schedule of implementation of commissioning of the suggested projects can be determined keeping in view the emerging trends in consumption."

The group has also favoured gas as against naphtha as the feedstock for production of fertilisers. Not only is the investment in a naphtha based plant higher compared with a gas-based plant, the energy consumption in the case of the former is also more. Since the operation of a gas-based fertiliser plant is relatively easy, a higher capacity utilisation is naturally expected, observes the group. It may be

pointed out that once all the fertiliser plants along the HBJ pipeline are commissioned, the share of gas as fertiliser feedstock will go up from the present 32 per cent to 45 per cent.

Since the cost of doubling of capacity will be very much lower than setting up of a new plant, it will result in a lower cost of production of fertilisers. Moreover, the existing unit will already have a developed marketing network.

PROCEDURES FOR EXPORTS SIMPLIFIED

Exporters would no longer have to submit copies of export contracts and orders as part of the procedural formalities, Mr. R. L. Mishra, chief controller of imports and exports announced in Bombay on May 11.

Henceforth, only a certificate from a chartered accountant will have to be submitted along with the application, he said in his address at a workshop on export and import policy organised by the Federation of Indian Export Organisations (FIEO).

Mr. Mishra, who is on a tour of the country to interact with exporters on the new exim policy, said various suggestions made by trade organisations and export houses were being examined and a final decision on their incorporation into the policy for 1988-89 would be taken in the next fortnight.

He ruled out the possibility of granting small-scale as well as deemed exporters the status of export houses. SSIs did not have an infrastructure to market their products even within the country so "how can we expect them to become international marketing organisations", he asked. However, he asked FIEO to submit a scheme for consideration.

SEPARATOR

Indiana offers overband magnet separator which, is of self-cleaning type. It consists of a stationary magnet and a heavy duty cleaning belt equipped with rubber cleats to facilitate complete discharge of tramp iron. Self-cleaning magnets are ideal where the amount of tramp iron is more. Access to the magnet is so difficult that manual cleaning is impractical.

They are used in foundries and plants for power, chemicals, fertilizers etc. The standard belt widths are 1,000 mm and 1,200 mm.

PSF, PFY, units told to use PTA from July

Manufacturers of polyester staple fibre (PSF) and polyester filament yarn (PFY) have been urged by the Government to switch over to the use of purified terephthalic acid (PTA) as raw material from July. Till that time, supply of dimethyl terephthalate (DMT), substitute raw material, will continue to be made so that the switch-over to the new arrangement is facilitated.

The Government will, however, ensure that DMT is made available to PFY and PSF manufacturing units using DMT as raw material. Also, the directive for switch-over to use of PTA is only for those PSF and PFY units, which have facilities for using both DMT and PTA as raw materials.

This decision was taken at a meeting in New Delhi on May 9 to assess the availability and demand situation in respect of DMT and PTA in the country and to take measures to correct demand-supply imbalances, if any, in this sector. The meeting was held under the chairmanship of the Secretary in the Department of Chemicals and Petrochemicals, Mr. H. K. Khan.

The meeting assessed the availability of DMT at about 12,000 tonnes and that of PTA at about 6,000 tonnes during the current year. DMT is produced by three units, namely, Bombay Dyeing, Indian Petrochemicals Corporation Ltd. and Bongaigaon Refinery. PTA is produced by Reliance Industries.

According to an official press release, issued at the end of the meeting, the Government told the producers of DMT and PTA and users of these raw materials that all the DMT and PTA produced in the country should be used. Representatives of producers and users of DMT and PTA, who also attended the meeting, expressed the view that with the suggested change-over to PTA, adequate quantity of raw materials would be available during the current year.

Expectation of adequate availability of the raw materials was based on the fact that some user units had already imported these raw materials fearing that there might be some problem in regard to their availability in the current year. But with the improved situation and the Government directive on switch-over, some surplus with some

units is not ruled out, the release states.

The users also pointed out that there were some units, which had valid licences for import of these raw materials. But these units had not resorted to imports in view of the fluctuating international prices of these raw materials. If imports against these licences also materialise, there would be no imbalance in the demand and supply of these raw materials.

Mr. Khan informed the participants that no increase in the price of DMT or PTA was permitted. The price of DMT is ruling at around Rs. 2,100 per tonne and that of PTA at around Rs. 2,350 per tonne. Prices of DMT and PTA are not administered by the Government, but these are monitored by the Department of Chemicals and Petrochemicals.

The apparent reason for the Government decision on switchover to the use of PTA is to facilitate easy availability of these raw materials for the entire industry. It is feared that there may not be adequate DMT in the country to meet the total requirement in the

current financial year.

The objective of the decision therefore is to ensure that units which can use PTA should use this raw material instead of DMT, produced by Bombay Dyeing, IPCL, and Bongaigaon Refinery, to relieve the demand pressure on these units.

However, industry observers say that the Government decision would actually ensure automatic placement of orders for PTA, which Reliance Industries began to produce recently. The Government suggestion would only step up the demand for PTA produced by Reliance Industries, since, earlier, units having facilities for using both DMT and PTA were not going in for PTA in view of its higher price compared to DMT.

Some time ago, the Government directed Bombay Dyeing to refund the excess amount charged by it on sales of DMT on account of the hike in import duty by Rs. 250 per tonne on paraxylene, a raw material used to produce DMT. The Government also disallowed any hike in the price of DMT. Both these decisions confirm that the Government is in favour of the PSF and PFY makers using PTA in preference to DMT, industry observers say.

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TN sops to spur growth

The Tamil Nadu Governor, Dr. P. Alexander, announced a package of concessions and other incentives to stimulate industrial development and trading activities in the State.

A sweeping array of sales tax concessions, estimated to cost the State exchequer Rs. 12-15 crores in a full year, the extension of capital subsidy scheme to new units in certain cases, the formation of a high-powered project investment committee, the sprucing up of the single window system for the small sector and a sprinkling of new norms for exemption from power cut form the centrepiece of the Governor's new package.

Announcing these measures at a crowded new conference the Governor described them as a generous package deliberately designed for ensuring a "quick start" on industrial rejuvenation in the State. The "deep, wide and adequate measures are fine-tuned to accelerate industrial development" in Tamil Nadu.

The steps now announced are but the "first instalment" of comprehensive framework to improve the investment climate. But these steps will be implemented straight away without having to refer them to Parliament or the President.

A string of other measures, requiring some changes in the prevailing tax laws of the State, are now being pieced together and will be presented very soon, the Governor said hinting that these measures may have to be vetted by Parliament.

The proposals, announced will produce a beneficial impact by the end of this year, Dr. Alexander hoped. Answering a spate of questions on the timing of his announcement when the State is under President's rule the Governor said the State's economic scene must be looked at from an economic stand-point, without attributing political motives or prejudice to the administrators of the day.

For a variety of reasons, with "no reflection" on "any previous Governor or Govt. in Fort St. George", the State has slipped on the industrial front over the last three decades. Therefore, unless, "realistic and bold steps" are now initiated we will be in for a very serious disaster by the end of the year.

There can be no question of postponing any corrective action, if it can help economic improvement, he further emphasised, brushing aside questions whether the new policy will be coterminous with President's rule. Any political Government coming to power after the present spell of President's rule may very well feel, "happy that the spade work has been done" on industrial rejuvenation in Tamil Nadu.

With these observations, the Governor put his new package for industry and trade in perspective. The more salient features of the proposals, bristling with the overtones of a mini-budget, are as follows.

The existing capital subsidy scheme will now be extended suitably to all the new units who have already availed themselves of this facility. The eligibility criterion is that the proposed new units must be set up in the notified backward areas. Such new units will also stand to gain the other sops like exemption from power cut etc., which are currently applicable only to the new units set up by new entrepreneurs in backward areas.

Given similar parameters, the subsidy on capital investment in the Rs. 1 crore to Rs. 2 crores bracket will be of the order of 18 per cent, subject to a maximum amount of Rs. 30 lakhs. The subsidy on the next investment slab of above Rs. 2 crores will be 15 per cent up to a limit of Rs. 35 lakhs.

The loans extended by the Tamil Nadu Industrial Investment Corporation (TIIC) and the State Industries Promotion Corporation of Tamil Nadu (SIP-COT) will now carry an interest rebate of two per cent.

Sales tax on textile machinery is halved to four per cent from the prevailing eight per cent, while the sales tax on footwear is withdrawn upto a turnover of Rs. 2 lakhs per annum.

As for the small sector, the district-level single window committee will review the clearance of applications, with a State-level committee, under the chairmanship of the Chief Secretary, overseeing the district-level clearances on a quarterly basis. The single window committees, in turn, will monitor the district industries centres.

To rehabilitate the sick units in the small sector, TIIC will now administer a new scheme of extending margin

money assistance, subject to a maximum amount of Rs. 5 lakhs.

At the same time, to help new small units get into their stride, the Tamil Nadu Electricity Board will give power connections to 1,500 units that have installed the necessary machinery but have not yet got the power supply for some reason or the other. This programme will be completed within three months from now, without affecting the power supply to the other sectors and without raising the level of the existing power cut on HT units.

On the power front per se, all LT consumers, who seek to graduate to the category of HT consumers by planning new investments in expansion or diversification projects, will now be exempt from power cut, presently applicable to all HT units, for a full period of five years.

Nonetheless, all such and other new units in the HT category, as well as the expansion units of the existing HT undertakings, will now be "expected" to set up captive power facilities to cover at least 20 per cent of their needs. The investment cost on such captive facilities will be financed as part of the project cost.

As for the State Government's own undertakings, investment decision powers will now be delegated to them. But a new project investment committee will alone be authorised to clear all the investment as also disinvestment proposals above the levels of Rs. 50 lakhs.

The various State-sponsored promotional agencies will be empowered, subject to the existing and proposed new guidelines, to disinvest suitably in the joint sector ventures they had earlier promoted. There is, of course, no blanket guideline to start on a clean slate by asking these promotional agencies to disinvest in all the joint ventures now in the red.

The Project Investment Committee will be chaired by the Chief Secretary and will consist of the Finance Secretary, the Secretary of the Administrative Ministry concerned and the Chief Executive of the State undertaking concerned.

At the same time, this high-powered committee will in no way breathe down the neck of the State undertakings on the exercise of their new delegated powers. Because, there is no intention of allowing "back-seat driving" in this case.

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Customs, excise rate changes announced

Changes in rates of certain customs and excise duty have been announced.

Countervailing duty exemption on paraxylene when imported for the manufacture of DMT (dimethyl terephthalate) or PTA (purified terephthalic acid) required to make man-made fibres, will continue till April 30, 1989, according to a notification of the Customs Department.

The exemption was to have ended on April 30 this year.

Another notification said that 32 sight-saving equipment like tonometer, synoptophor and prismbars, and colour vision testing equipment have been exempted from customs duty.

On another 20 ophthalmic equipment the customs duty will be a concessional 40 per cent. These include contact lens lathe, exophthalmometer, lantoscope and cryolathe.

The effective basic customs duty on styrene monomer has been fixed at 25 per cent ad valorem plus Rs. 1700 per tonne without any auxiliary duty, says another notification.

Customs duty on uranium hexafluoride (UF-6) i.e. enriched uranium when imported for fabrication into fuel elements for use in atomic power reactors, has been reduced to 40 per cent ad valorem. The reduction will be effective till March 31, 1990.

An excise notification issued has sought to prescribe a concessional rate of basic excise duty at five per cent ad valorem on textile fabrics coated/laminated with preparation of low-density polyethylene.

The basic excise duty on sacks and bags made of polymers of ethylene or propylene will be a concessional eight per cent.

PANEL TO MONITOR IMPORT DUTIES SET UP

As part of its efforts to make the Indian industry competitive, the Government has set up a high-power committee of officials to keep a close watch on international price trends and promptly recommend adjustments, downward or upward as the case may be, in import duties.

Set up at the instance of the Prime Minister, Mr. Rajiv Gandhi, the committee is headed by the finance Secretary, Mr. S. Venkitaramanan and includes the Commerce Secretary, Mr. A. N. Varma, the Revenue Secretary, Mr. D. Bandopadhyay, the Chief Economic Adviser, Mr. Bimal Jalan, the Industry Secretary, Mr. Otimia Bordia and the Additional Secretary in the Prime Minister's office, Mr. Montek Ahluwalia.

The main task of the committee, which is expected to meet at least once a month, is to restore balance among considerations of revenue, economic growth and industrial health. The committee has already started functioning, according to official sources.

There have been representations that whenever international price of an item goes up the indigenous industry is to pay more for the item without any relief in import duty. This often affects the economic viability of the concerned industry.

The Government has also realised that merely increasing the revenue would be counter-productive if it were to make the Indian goods uncompetitive due to high costs.

The Prime Minister is keen on ensuring that high costs do not continue to affect the Indian industry.

In this context official sources point out to the problem faced by the copper industry last year.

The committee has powers to reconcile different points of view in making its recommendations to the Finance Minister for adjustments in import duties.

SOLVENT TO DISSOLVE OZONE PROBLEMS

An important step toward phasing out the use of chlorofluorocarbons (CFCs), which are thought to be destroying the earth's ozone layer, has been announced in Washington by AT & T, the US telecommunications and electronics giant.

The company says it has identified and begun to use an alternative solvent in its electronic circuit board manufacturing plants and is offering to provide the technical know-how to other electronics companies.

Electronics and semiconductor manufacturers are among the biggest users of CFCs. The chemicals are widely used as solvents to remove soldering flux residues from electronic components, especially on advanced surface mount circuit designs such as those used in most personal computers.

The problem of replacing the chemicals in electronics manufacturing has been a major concern since the role of the chemicals in depleting the earth's ozone layer was recognised.

AT & T's replacement for CFCs is a substance that is derived from citrus rinds, pine tree bark and other wood waste products. Called Bioact EC-7, the bio-degradable solvent is produced by Petroferm Inc. of Fernandina Beach, Florida. All components of Bioact EC-7 are either generally regarded as safe or are actually authorised in the U.S. as indirect food additives, Petroferm says.

By substituting Bioact, AT & T expects to be able to reduce its use of CFCs by a quarter to a third over the next two years. The new solvent is expected to make an important contribution toward enabling electronics companies to reduce their use of ozone-damaging chemicals.

Currently, Bioact EC-7 can be used to clean only those electronics products that can be immersed in water during manufacturing. This will limit its use to some extent because some types of integrated circuits cannot withstand such a dunking.

Despite its apparent limitations, AT & T's announcement has been hailed by environmentalists and by the US Environmental Protection Agency as a major step forward.

CFC compounds, which are also used in refrigeration and the manufacture of plastic foams, can last a century in the atmosphere before breaking up to liberate chlorine.

CUSTOMS DUTY ON ACRYLONITRILE CUT

The basic customs duty on acrylonitrile has been reduced from 70 per cent to 15 per cent ad valorem, under a notification laid on the table of Rajya Sabha by the Minister of State for Finance, Mr. Ajit Panja, on May 11.

FERTILISER NEWS

GUJARAT SALES TAX ON SUBSIDY:

Fertiliser units perturbed

The commissioner of sales tax's attempt to levy sales tax on subsidy received by fertilisers, pharmaceuticals and certain chemical industries in Gujarat has created a lot of heat, particularly in the case of the fertiliser units.

According to fertiliser industry sources, the commissioner's move is fraught with anomalies and absurdities. It may also flare up an agitation by farmers in Gujarat as it will be tantamount to increasing the prices of fertilisers. Further, this will result in reduction of consumption of fertilisers in the state.

Ironically, even as the Gujarat government is attempting to levy sales tax at an escalation rate, many state governments like Maharashtra, Punjab and Haryana have exempted fertilisers from sales tax levy while in some other states it is levied at reduced rates.

The sales tax department has initiated action to levy sales tax on the subsidies, received from the central government by various fertiliser units in Gujarat, right from the day they have started receiving such subsidies. Therefore, in some cases like GSFC and IFFCO, the levy will commence from 1976.

Apart from the legality of the issue, the industry sources say, even from the pragmatic point of view, such action would prove disastrous not only to industry but will create a lot of problem for the state government itself. For the fertiliser industry, the retention price for each unit is fixed, keeping in view its cost of production and return of 12 per cent post tax on its net worth. In case of the below-listed units, manufacturing urea, different retention prices have been fixed for their various products although the sale price will remain the same.

It will be observed from above that in case of urea fertiliser, there is one retention price for GNFC, another for GSFC and a third for KRIBHCO. All these units are required to sell urea at

a price of Rs. 2350 per tonne fixed by the Central government. Since the retention price scheme permits the manufacturer to recover Sales tax from their buyers on sales price, these companies collect sales tax on price charged to their buyers and pay to Gujarat government. Now sales is to be charged on the basis of retention price (that is retail price plus subsidy), there will be different prices for the same product for the purpose of sales tax, although sale price will be same as fixed by the Central government. Further, the invoices will have to be made at a sale price and then additional sales tax will have to be charged on subsidy which is not a "sale price" as contemplated under the Gujarat Sales Tax Act, 1969, thus, it will make it illegal for the manufacturer to

collect such additional sales tax. This will also lead manufacturers to violate the provisions of the Essential Commodities Act, as he cannot charge any price higher than the same stipulated under the fertiliser control order. Since the sales tax is to be collected from buyers, the Gujarat farmers will be asked to pay at different rates for the same product, depending on their source of supply. Enforcing the decision to collect sales tax on subsidies will lead to same absurd and illegal situations. No manufacturer will absorb sales tax and, therefore, the moment he will start recovering additional sales tax from buyers, there will be agitations from farmer consumers. Since in Gujarat most of the sale of fertilisers is through co-operative sector, this sector will also be up in arms. Further, the decision is to recover tax retrospectively and, therefore, the manufacturers will have to initiate actions for recovery of sales tax for past sales leading to an unimaginable situation. Yet another aspect to be considered by the government, will be the consumption of fertilisers in Gujarat. The sales tax rate in Gujarat

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is already on the high side, and will still go higher. Unwittingly, the Gujarat government's decision to levy sales tax on subsidy will benefit manufacturers who are selling fertilisers in the state but are having their plants outside Gujarat. For example, Rashtriya Chemicals and Fertilisers (RCF) can sell urea to Gujarat State Co-operative Marketing Federation (GUJCOMASOL) at a whole-sale price fixed by the Central government. Since the sale will take place in Bombay, GUJCOMASOL may have to bear the sales tax of Maharashtra but since there is total exemption from sales tax on fertilisers in Maharashtra, the urea of RCF will be available to GUJCOM-

ASOL at wholesale price without any sales tax. Now, when GUJCOMASOL sells this urea to consumers, its price will be wholesale price at which it has purchased the same. Since this price will not contain the subsidy element, GUJCOMASOL will not have to pay any sales tax on subsidy. Thus, manufacturers selling fertilisers in Gujarat but having their factories outside Gujarat will have the added advantage and will be able to sell their fertilisers without any marketing effort, and thereby resulting in large-scale diversion of trade. It seems as though the state government has not fully applied its mind on the matter and is a hastily thought of revenue making move.

Company	Retention price (Rs./mt)	Sale price (Rs./mt.)	Subsidy/sale price if ST is charged on subsidy (Rs./mt.)
GSFC	2626	2350	2525
GNFC	3643	2350	2525
KRIBHCO	3400	2350	2525

RECORD OUTPUT BY HFC

The Hindustan Fertiliser Corporation Ltd. achieved a record production 4.81 lakh tonnes of urea in 1987-88 registering an increase of 13.44 per cent in production over the previous year's production of 4.24 lakh tonnes.

Consequently, the capacity utilisation of HFC has gone up by seven per cent registering 48.6 per cent in 1987-88 over previous year's 41.6 per cent.

HFC has shown steady improvement in capacity utilisation since October-December quarter of 1987-88 during which it produced 1.52 lakh tonnes of urea in comparison with 1.24 lakh tonnes in the corresponding period of 1986-87 registering a steep rise in production by 22.5 per cent.

In January-March quarter of 1988, the corporation produced 1.55 lakh tonnes in corresponding quarter of 1986-87, registering a 28 per cent rise in production of urea, says press release.

Namrup-III plant of the corporation has been commissioned successfully and is undergoing process of stabilisation. Initial performance of this plant has raised high hopes and is expected to add to profitability of the corporation.

Apart from better performance in production, HFC attained 64.5 per cent increase in despatches of indigenous urea with a total despatch of 6.63 lakh tonnes in 1987-88 over the previous year despatch of 4.03 lakh tonnes.

Despite drought and flood situation in the country, HFC has been able to achieve the highest-ever sales by selling 5.15 lakh tonnes of indigenous urea in 1987-88. This is an increase of 50.74 per cent in sales as compared to sales of 3.41 lakh tonnes in the previous year.

For increasing fertiliser consumption, HFC has been making serious efforts in farmer's education with the main thrust in Assam and north-east by increasing awareness for more fertiliser consumption with better nutrient balance, use of high-yielding varieties of seeds and following new cropping pattern. Beginning with a modest sale of 1000 tonnes in 1970 in Assam and the north-east, HFC, which now sells one lakh tonnes of fertilisers with a growth rate of 15 to 20 per cent in consumption a year, has emerged as the largest fertiliser marketing company in the north-east.

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MELAMINE PROJECT EXPANSION:

GSFC may utilise own technology

The Gujarat State Fertilisers Company (GSFC) is seriously thinking of the expansion of the melamine project with its own expertise because the response of technology offer from outside is poor. It has already done substantial ground work.

The selection of process licensor, engineering contractor and Indian contractor have been finalised for the cyclohexanone (anone) and caprolactam (lactum) plants. For the anone plant, with benzene as raw material, Cora Engineering, Switzerland, has been selected as the licensor. Their offer is based on the process of Polserice, Poland which is the best technology available. The world renowned multinational company, BASF, West Germany, has been selected, as another licensor. It is as possible to obtain BASF's offer through persuasion and after convincing them of GSFC's capabilities.

UHDE GmbH, West Germany has been selected to provide basic and detailed engineering procurement of imported equipment and for providing expatriate personnel for mechanical completion and commissioning of both the anone and lactum plants.

UHDE (India) Ltd. will be the contractor for procurement, supervision of erection, mechanical completion and commissioning of both the plants.

Agreements with all the parties have been executed. Applications to appropriate authority for requisite approvals have been made, it is expected that the project will be completed in a few months time.

The selection of consultants for the ammonia plant expansion is under active consideration. While efforts are being made to persuade the Union Government to make allocation of gas for the project the option of using naphtha as feed stock has also been kept open. As soon as selection of consultants is over, the work on the project will commence.

The company had earlier approached the Centre for setting up a nylon spinning unit wherein caprolactum manufactured by the company is used as raw material. Since the Government has already granted approval to this

project company GIIC, it had declined to grant a letter of intent to the company.

Subsequently, GIIC the original promoter requested the company to implement this project. In terms of the memorandum of understanding reached between the company and promoters of Gujarat Nylons Ltd. (GNL), the company has taken the responsibility of providing necessary technical, managerial and financial support to implement its nylon project.

Accordingly, the company has nominated five directors on the Board of Directors of GNL and also provided necessary financial assistance to the tune of Rs. 9.95 crores upto December 31, 1987.

This project is now in the advanced stage of construction and the plant is likely to be commissioned in phases beginning from July 1988. The revised estimated cost of the project will be around Rs. 115 crores. This plant

will be formally taken over soon and will be managed as a unit of the company.

The co-generation project proposed under the energy conservation scheme by GSFC, estimated to cost about Rs. 33 crores, is progressing satisfactorily. Loan assistance of Rs. 22 crores has been sanctioned by the financial institutions. Most of the civil work has been completed. Orders for most of the equipment have been placed. Some equipment and machinery including boiler have been received at site.

The first phase is expected to be completed by mid-August and generation of power may commence in November/December 1988. The second phase of the project is estimated to cost Rs. 38 crores. Orders/letters of intent for major equipment have been placed/issued.

Although the polymers unit is now technically and physically capable of achieving upto 120 per cent capacity utilisation, due to continued irregular and erratic availability of the main raw material, namely HCN, and due to la-

(Contd. on p. 51).

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Modis to launch caprolactam plant

The Modis are all set to launch their largest-ever project — a Rs. 350-crore caprolactam plant in Orissa. Talking to *The Economic Times*, Mr. M. K. Modi, who is the managing director of both Modipon Ltd. and Modi Industries Ltd., said the 50,000-tonne-per-annum plant will be set up by the group along with IPCOL, the Orissa industrial promotion agency. For technology tie-ups, the Modi group is negotiating with the Ube, the Japanese giant, as well as a number of other world leaders in the field. Mr. Modi said the necessary applications for the project were likely to be cleared by the Union government shortly.

As much as 30,000 tonnes of caprolactam is currently being imported and only around 15,000 to 20,000 tonnes is manufactured by the public sector Gujarat State Fertiliser Corporation (GSFC). However, GSFC and FACT (Fertilisers and Chemicals Travancore) are both setting up plants of the same capacity as the Modis. While GSFC is believed to have tied up with BASF of West Germany for know-how, FACT,

it is learnt, has opted for technology from DSM, Holland.

To be located at Rourkela, near the Rourkela Steel Plant, the Modi group's latest venture would either be assisted by or in the joint sector with IPICOL as the partner, Mr. Modi indicated. The work on the project is expected to commence by the end of this year after the necessary approvals and formalities are obtained. Mr. Modi said the project would need a gestation period of three years before it could begin production.

As a departure from the Modi industrial philosophy, which is characterised by having equity collaborations in addition to know-how tie-ups with foreign collaborators (viz ventures with Xerox, Olivetti, Champion, etc.), the latest project may not involve equity participation by the foreign firm. A chemical project of the size of the caprolactam plant is "a very different ball game", according to Mr. Modi. In the aftermath of the Carbide plant disaster in Bhopal and some other mishaps in chemical units in India, inter-

national giants in the field are reluctant to participate in the equity of projects here since a Supreme Court stipulation requires the directors have unlimited liabilities.

While the tie-up for the caprolactam project is not yet finalised and talks with UBE of Japan are under way, Mr. Modi did not rule out the possibility of tie-ups with either of the other two international companies — BASF and DSM — although they have already entered into collaborations with GSFC and FACT.

Availability of the main raw materials — benzene and ammonia — for the project, according to Mr. Modi, would not pose any problems as they could be obtained from the two public sector companies, namely Bharat Petroleum and Steel Authority of India Ltd. The Modi group, which currently has a total turnover of around Rs. 1,200 crores to Rs. 1,300 crores, expects an additional turnover of the order of Rs. 200 crores once the caprolactam project goes on stream. The Modis, incidentally, already have a strong presence in the chemicals industry in the way of Modi Alkalies and Chemicals Ltd. and Modipon Ltd. which manufacture caustic soda, industrial and agricultural chemicals, etc.

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FINE CHEMICALS & DRUGS

Indian co.s bid to foray into U.S. drugs market

More than 20 Indian drug companies are seeking approval of their bulk drugs and production facilities by the U.S. Food and Drugs Administration (FDA) in a bid to penetrate the \$4 billion US market for generic drugs.

The Indian firms have already obtained FDA registration following the opening up of the US genetic drugs market by the Waxman and Hatch Act passed by the US Congress in 1984. In 1985, Cipla Ltd. became the first Indian company to tap the US generic market. All four factories of the company have been approved by the US authorities. Cipla's exports to US generic drugs manufacturers include danazol, ibuprofen and clonidine.

Other firms which have reportedly obtained US approval include Lupin, Ranbaxy, Standard Organics, Dr. Reddy's Laboratories, Ortho Pharma, Sunita Laboratories and Unichem. Apart from the quality of the bulk drugs, the US FDA insists on stringent goods manufacturing practices (GMP) at the production facilities. The FDA sends a team of officials at its own expense to each factory site to inspect the GMP and the approval granted for a specific bulk drug is valid only for two years and has to be renewed.

The following bulk drugs produced in India have already been registered with the US FDA — albuterol, ampicillin, chlorpropamide, clonidine, danazol, doxycycline, hydrochlorothiazide, ibuprofen, mebendazole, methocarbamol, methyl dopa, metoprolol, metronidazole, nifedipine, propranolol, sulfamethoxazole, vinblastine and vincristine.

The Waxman and Hatch Act, which made sale of generics possible for products whose patents were expiring was the culmination of a protracted debate on the high cost of health care and medicines, in particular. Consumer groups in the US attributed the high price of pharmaceuticals to patent laws which restricted entry of new producers and the strong brand image estab-

lished by reputed firms. With the entry of generic drugs, prices in the US have fallen significantly.

Sulfamethoxazole and trimethoprim expired last year, opening up markets for products where India has a competitive edge. Drugs which are to go off the patent list in the coming decade, already being produced in India, include nalidixic acid, piroxicam, albuterol, amoxicillin, miconazole, nifedipine, naproxen, alprazolam, atenolol, cimetidine, terbutaline, captopril and cisplatin.

The list of generic drugs in the US has swelled from less than 50 in the 1960s to 160 today. Generics constituted \$4 billion out of the total US drug market of \$30 billion last year. The generic market is expected to grow to \$11 billion by 1998, out of which \$8 billion will come from generic drugs based on patents expiring between now and 1998.

According to Dr. Y. K. Hamied, Cipla Managing Director, antibiotics will constitute 44 per cent of this generic market. "At some stage, India will have to concentrate on large-scale manufacture of selected antibiotics to have a better share of the US drug market. At present, USSR accounts for the bulk of India's drug exports. Dr. Hameed sees vast scope for Indian firms in the production and export of bulk drugs whose international patents have expired or are due to expire in the near future.

Industry observers point out that the attempt to get the US FDA's recognition has contributed to great improvement in the manufacturing procedures and quality standards of Indian companies. Dr. R. K. Bammi, a Cipla Director, acknowledged that the effort to conform to the quality and GMP norms of the US agency has helped the company achieve international standards.

Exporters of bulk drugs to the US will be dealing directly with the end-users (the formulations manufacturers) unlike in the case of Europe where im-

porters are mostly trading houses. Mr. Ramu Deora, Chairman of the Basic Chemicals, Pharmaceuticals — and Cosmetics Export Promotion Council, pointed out that some of the materials sold to such trading houses are repackaged and sold to third parties at a premium.

Mr. Deora felt that successive droughts have squeezed the purchasing power of Indians, affecting pharmaceutical sales. This has enticed many more manufacturers to the export arena. The new Exim policy has also offered new incentives to exporters. They are now allowed export of free samples up to Rs. 1 lakh a year or Rs. 25,000 on a single consignment, which can be airfreighted without going through customs, RBI or licensing authorities.

From a mere Rs. 8 crores in 1967 drug exports have increased to Rs. 280 crores last year. The USSR accounts for 33 per cent of India's exports and the US 14 per cent. A major factor in pushing up exports is the increasing liberalisation in the import policy and the advent of the advance licensing system. Over the years, India has also shed her image as an exporter of poor quality material. Unfortunately, a few major complaints have of late surfaced, particularly in the case of mebendazole, and industry sources blame Indian trading houses for trying to make a quick buck.

SUBSIDY FOR NEW ENERGY SOURCES CONSULTANCY

A scheme of subsidy for consultancy on use of non-conventional sources of energy and energy conservation measures is being introduced by the Industrial Finance Corporation of India (IFCI) from July.

An IFCI press release said the scheme would provide subsidised consultancy services to the beneficiaries in the rural, tiny and small scale sector through the institutionally sponsored technical consultancy organisations (TCOs) operating all over the country.

According to the press release, IFCI would fill a vital gap by making available consultancy services through institutionally sponsored TCOs to eligible beneficiaries at a subsidised fee. The extent of subsidy will be 50 per cent of the fees or Rs. 5,000, whichever is less.

Countrywide token strike by chemists

Chemist and druggist establishments all over India have decided to down shutters on May 25, in a one-day token strike to protest against the government's prevarication on the issue of margins payable to the pharmaceutical trade.

The strike call has been given by the All-India Organisation of Chemists and Druggists (AIOCD), the apex body of all state-level organisations representing chemists and druggists.

The AIOCD is pressing for restoration of the margins granted under the government's Drug Price Control Order (DPCO) of August 1987, which permitted a 15 per cent margin on non-ethical drugs and a 17 per cent margin on ethical drugs (which on the whole worked out to on a average margin of 16.2 per cent). The DPCO also allowed a margin of three per cent for (non-company appointed) wholesalers. It, however, made no mention of the margins permissible to company-appointed distributors/wholesalers who were already getting margins of around eight per cent from most manufacturing companies in the past.

The problem, however, arose when the government, probably to rectify the lapse (of not stipulating margins payable to company-appointed wholesalers/distributors), decided to refer the matter to the Kelkar committee in December 1987. After prolonged negotiations, the Kelkar committee managed to persuade representatives of the AIOCD to settle for an average margin of 15.5 per cent (against the average of 16.2 per cent applicable under the DPCO of 1987) with the additional benefit of 50 paise to be paid to chemists against each prescription during the day-time, and Re. 1 prescription presented during the night-time. The representatives of the AIOCD are reported to have finally accepted this proposal.

The trade was, however, surprised when it came to learn that the Kelkar committee had decided to push through a proposal that a margin of 16 per cent be paid to chemists on pharmaceutical goods sold, but that such margins should be calculated without taking the excise duty component into consideration. Although in terms of percentage the margins proposed were higher than had been negotiated with

the AIOCD earlier, the previous margins had been calculated inclusive of the excise duty. The new proposals, according to trade sources, meant a drop of almost four per cent from what had been passed by Parliament as part of the DPCO, 1987, and had even been gazetted.

According to the AIOCD, "by issuing the Drug Prices (Control) Order of 1988, the government has betrayed us and has affected our survival." To press for what the AIOCD considers its rightful margins of 17 per cent and 15 per cent on ethical and non-ethical drugs respectively, the AIOCD has decided to go on a token one-day strike.

But some observers feel that this strike is not likely to be successful all over India. This is because, unlike the period 1981-85, when the trade managed to wrest the margins it wanted from pharmaceutical manufacturers in an unusual show of unity, it is fragmented today. "At present it is only the western and eastern sectors that present a unified front," says one informed source. Consequently, the one-day token strike is likely to affect only those areas located in the western and eastern sectors.

Whether the trade does succeed in forcing the government to grant its demands remains to be seen. But the trade sees things differently. Says an AIOCD representative, "What is at stake is a fundamental issue. Can a committee appointed by the government reverse decisions approved by the Parliament of the land and which are subsequently also gazetted?"

IDMA CHIEF'S MEMO PERTURBS MEMBERS

Members of the manufacturing units in the drugs industry in the national sector affiliated to the Indian Drug Manufacturer's Association (IDMA) are highly perturbed over a memorandum sent by their president to the Industry Minister and Health and Family Welfare Minister doubting the reports of in-house testing facilities of drugs manufactured.

The memorandum sent by IDMA President has come as a shock to the members of the drugs industry since they feel that the IDMA President has cast aspersions on a large number of

drugs manufacturers especially since the Government intends to make the drug manufacturers more responsible and more rigid in quality control.

The Union government in 1971 amended several drugs rules and made it statutory for drug manufacturers to have their own testing laboratories. It is a world-wide practice to test the basic raw materials and maintain the quality of the end products.

Mr. Vinobhai U. Shah, President of IDMA, in his memorandum to the Government authorities has said that there cannot be any guarantee of objective testing and analysis of the product if these tests were conducted by the manufacturer. This in turn could result in sub-standard drug or health hazard to the consumers depending on the influence of the employer.

Mr. Shah wondered if it was possible to rely on reports of the manufacturer's in-house testing facilities and instead suggested that testing of products meant for human consumption and contributing to health should be done very objectively and be treated as a special activity.

Mr. K. D. Vora, member of IDMA and ex-President of Bombay Chemists and Druggist Association protested strongly and said this was a most reckless and reprehensible charge levelled against the manufacturers.

NEW DRUG TO CURE BALDNESS

The Hyderabad city-based bulk drug exporter-cum-manufacturer, Dr. Reddy's Laboratories Ltd. (DRL) has come out for the first time in the country with a new drug for baldness.

The drug, Minixidil, has been approved in France, Canada, Spain and other countries and is expected to be approved in the US shortly. Formulated under the brand name. Formulated under the brand name 'Minitop' it will be sold by DRL firm this month-end.

Addressing newsmen in Hyderabad recently Dr. K. Anji Reddy, Chairman of the company, said that the drug for cure and prevention of baldness will be a prescription item atleast initially. It has proved successful wherever was introduced, he added.

DRL has reported excellent results during the year 1987 with turnover almost doubling to Rs. 11.94 crores.

Drugs from the deep

A UK diving company is offering a unique marine specimen collection service for pharmaceutical researchers interested in the curative properties of marine organisms.

Recent research into these marine species has yielded nearly 2,000 new chemical substances and of these, around 10 per cent have been shown to have anti-tumour, anti-microbial, cardiotonic or immuno-modulatory properties.

"The seas are a vast and mainly untapped resource, although they contain over 80 per cent of the world's animal species," explained Mr. Neil Cave, projects director of the UK Sea Survey company. "And it is only recently that a systematic search for new biologically-active compounds has been started.

"Our company has what we believe to be a unique ability to operate without a submersible at depths down to 122 metres in a very cost-effective and highly portable manner. So we are able to significantly reduce the cost of the collection phase of marine specimen research projects."

Mr. Cave believes that nevertheless the relatively high costs of underwater collection are completely justified. He continued. "Already marine specimens have yielded totally new bio-active compounds which exist nowhere else in landbased or chemically synthesised drugs. They are absolutely new and their properties could open up entirely new forms of treatment. Additionally, many drugs in current use are becoming less effective as diseases develop resistances to them. So the discovery of entirely new drugs will allow continued treatment of these mutating diseases."

Probably the most significant properties of marine specimens tested so far, according to Mr. Cave, are those which suppress the growth of tumours. Other compounds have been found which inhibit viruses and microbes or modify the operation of the human immuno system. "It is early days yet but around 12 compounds made from marine specimens are very close to going in to human clinical testing,

after showing a lot of potential in earlier tests," he said.

GMM TIES UP WITH PFAUDLER

Superior glasslined equipment will now be available to Indian users following the technical and financial tie-up of Gujarat Machinery Manufacturers Ltd. (GMM) with Pfaudler Companies Inc., of the US.

Pfaudler, which has recently acquired 40 per cent equity stake in GMM, has nominated three directors on the board of the Indian company.

The acquisition of the equity stake by Pfaudler was achieved by increasing GMM's equity capital from Rs. 63.67 lakhs to Rs. 1.06 crores. The collaborators had subscribed 42,448 equity shares of Rs. 100 each at a premium of Rs. 150 per share by paying a total of Rs. 1.06 crores in each.

With this cash subscription, the liquidity of GMM has improved considerably, and would help improve production and widen the product range according to Mr. Ashok J. Patel, managing director of GMM.

The financial participation of Pfaudler in GMM has led to the dilution of the interest held by the Patels and their associates from about 58 per cent to 36 per cent.

GMM, manufacturers of glasslined equipment since 1969, have been using a technology that is 30 years old, following a technical collaboration with Lampart of Hungary.

A unique feature of the sophisticated glasslining technology is that it is not available in books or manuals, according to Mr. Patel. The formula is a proprietary secret, he added.

The new collaboration with Pfaudler will help the company to bridge the technological gap and bring out glasslining equipment upto 20,000 litres against 10,000 litres now, he said.

The company will soon start applying the Pfaudler formula at its plant in Karamsad, Gujarat which has numerous advantages like withstanding higher thermal shock, improvement in corrosion and longer life he said.

The major benefit accruing to GMM by using the Pfaudler technique is saving on energy and fuel expenditure bill, which will come down by 30 per cent, according to Mr. Patel.

Under the collaboration agreement, GMM's range of equipment will now include glasslined reaction vessels, storage vessels, distillation columns, dryers, pipes and fittings, valves and heat exchangers, he said.

GMM's corrosion resistant equipment is at present being used by chemical processing and allied industries like pharmaceuticals, pesticides, fertilisers, petrochemicals, dyestuffs and food processing industries, he added.

NO CRUDE PRICE HIKE

ONGC has asked for an upward revision in the price of crude oil produced by it, the Lok Sabha was informed on May 10th.

However, the Government does not propose to increase the crude price 'at this stage' as it feels that the current price paid to ONGC adequately covers its cost and other expenses, the Petroleum Minister, Mr. Brahm Dutt, told Mr. S. B. Sinal.

(Contd. from p. 49).

bour unrest for a few months, production could not exceed 64 per cent of capacity utilisation. Therefore, the unit could not produce monomer to satisfy the indigenous demand resulting in imports. Nonetheless, the sales performance of the unit has been satisfactory.

The industrial licence for methacrylic acid (MAA) has since been received and production has commenced. However, changes in the import policy resulting in reduction of customs duty affected the operation of the MAA plant.

To attain maximum production and profitability, high-value added products are being identified.

The outgoing GSFC Chairman and Managing Director, Mr. Moosa Raza, who will shortly take up his new assignment as Chief Secretary, said that the company hopes to touch a production level of 1.2 million tonnes by the end of this year.

Various expansion and diversification projects worth about Rs. 1,000 crores, being implemented currently, would help the company achieve a turnover of about Rs. 1,000 crores by the end of this decade, he said.

TN small drug units in doldrums

The small-scale units in pharmaceutical industry in Tamil Nadu are facing a crisis today, with very little weightage given to its marketing efforts in State Government policies.

For one, the 350-odd units in the State are finding it difficult to pull on in the face of top-sided Government policy that favours bigger units in the public and joint sectors. It may sound paradoxical that the Government, which has been extending all possible assistance to the growth of the industry in the State, has failed to sustain it.

As the industry spokesmen often point out, the Government has been very liberal in providing facilities like land, financial assistance, power, etc., for the industry. In addition, it has introduced a special capital subsidy of 10 per cent for units irrespective of their locations. But, its preferential purchase policy in regard to public health programmes favouring a few public sector units and a single joint sector unit in the State has nullified all the good work done by the Government for the development of the industry in the State, it is said.

Till 1970, the Government hospitals in Tamil Nadu had been drawing their requirements of drugs and formulations from the Madras Medical Stores Depot (MSD), a Union Government organisation. MSD used to float tenders calling for quotations for such items as were not covered by DGS & D and the purchases were effected on the basis of the lowest prices offered. The final price charged on the hospitals included a 10 per cent margin to meet the overheads of MSD which worked on a "no profit no loss" principle.

In the mid-seventies, the Government constituted a 'task force cell' to review the system and suggest a method for effective and economical distribution of drugs in Government hospitals. The present system, which gives monopoly to public sector and joint sector units, was evolved following the recommendations of the cell.

The Government then set up a committee for purchase of drugs for hospitals with the Director of Medical Education and the Director of Medical Services and Family Welfare as Chairman on a rotational basis every year. The committee was entrusted with the task of fixing the prices of drugs

the hospitals purchased directly from these undertakings.

It was, however, decided that in cases where the public sector or joint sector undertakings are not in a position to supply any drugs, these should be procured from the local pharmaceutical industry through SIDCO. Again, if SIDCO is unable to supply the drugs, open tenders have to be floated for purchases from private manufacturers.

It is alleged that this system of Government purchases has been largely responsible for all the woes of the pharmaceutical industry in the State. In fact, the small and medium units depend on Government purchases for their survival as it does not entail any promotional expenditure which they otherwise will have to incur on sales in the open market.

As it is, the Government's purchase policy that weighs heavily in support of public undertakings, has actually resulted in an uneven growth in the profitability of the only joint sector unit in the State. The very term 'joint sector' is said to be a "misnomer—considering that the State Government's stake in the company is only to the extent of 25 per cent."

DRUG PRICES AND QUALITY

Addressing the annual meeting of the Organisation of Pharmaceutical Producers of India (OPPI), its President, Mr. C. M. Hattangadi, unhesitatingly acknowledged that the new drug policy and pricing norms recognised that price was a function of cost, and that a reasonable return on capital was necessary for giving a boost to the production of essential drugs. But the industry's happiness over the drug policy may be short-lived. The Secretary to the Department of Chemicals and Petrochemicals, Mr. H. K. Khan, has dropped dark hints about fixing prices on the basis, among other things, of the purchasing power of the people. He reminded the industry that "the earning capacity of a vast majority of our people is limited and, therefore, medicines have to be priced in such a way that they are within their reach". He exhorted the industry to project its correct image as "there is a feeling among members of the public that the industry is benefitting from Government policies without giving due returns to the com-

munity, that 'indiscriminate imports are taking place and that prices and profitability are exorbitant'. Stringent price control all these years discouraged the industry from stepping up production by making fresh investments. Moreover, imports are controlled by the Government. The Government knows that investors are shy to invest in the industry because of its low profitability.

Mr. Khan states that "you and I may know the real facts but is it necessary that the public should also be acquainted with what is happening? Even if the industry intensifies its efforts to interact with the public, the desired results are unlikely to be achieved for the simple reason that the suffering public does not like to pay even reasonable prices as purchases of drugs are involuntary. Not surprisingly, enhanced prices of decontrolled drugs have been resented by the public if the Government succumbs to popular pressure and re-imposes draconian price controls, even on supposedly decontrolled drugs, the industry is unlikely to secure an attractive rate of return on capital employed. In that case, it won't make the heavy investment needed to produce drugs needed for achieving the goal of health for all by 2000 A.D. Mr. Hattangadi says that according to NCAER, the additional rate of investment called for is 10 times the present rate.

Mr. Khan says that "the Government has to heed the voice of the people". The Government has to heed the voice of the people". The Government can strike a balance between interests of producers and users of drugs by "reducing the burden of taxes, duties, and levies on medicines, which at present account for about a third of the price consumers pay", as suggested by Mr. Hattangadi. For its part, the industry must observe quality control at any cost. The Lentin Commission has said that the existing rules and regulations in this regard ought to be enforced stringently. The Government's decision to augment drug testing facilities by setting up five laboratories involving an outlay of Rs 25 crores is most welcome. In the final analysis however, "the manufacturer must assume responsibility for the quality of the drug he produces as emphasised by the World Health Organisation.

— Financial Express

GM OF INDIAN CHEMICAL AUXILIARIES MFGRS. ASSN.

Outstanding work of CCMB & RRL, Hyderabad highlighted

The excellent work done by the Centre for Cellular & Molecular Biology (CCMB) and the Regional Research Laboratories (RRL) Hyderabad, were highlighted at the 35th annual general meeting of the Indian Chemical Auxiliaries Manufacturers Association at Bombay on 23rd April. Dr. Pushpa Mitra Bhargava, Director CCMB along with his fellow scientists Dr. Lalji Singh, Dr. (Mrs.) Somdatta Sinha and Mrs. Chandana Chakrabarti (all from CC & MB) and Dr. P.B. Sattur and Dr. V.T. Bhalerao, Senior Deputy directors of RRL, had specially come to Bombay to attend the annual general meeting.

Earlier, the incoming president of ICAMA, S.K. Parekh welcomed the guests. Mr. Chandrakant I. Bhuva, the outgoing president also addressed the gathering. Mr. R.N. Gandhi, the incoming Vice-President proposed a hearty vote of thanks. The meeting was followed by 'Gazals' by Sonali Jalota. The following is a summary of the speeches.

Mr. Parekh's Speech

Welcoming the Chief Guest Dr. Bhargava and his team from CC & MB and Dr. Sattur and Dr. Bhalerao from RRL, Mr. Parekh said these scientists were very distinguished in their own fields. They were real assets to our nation.

He said: "The Association has completed 35 years of fruitful service. It is a record for any association to feel legitimately proud. The Association has varied membership from DGTD units, SSI units, manufacturing units of various chemical sectors. The Association has taken up many issues relating to import, export, sales tax etc. with the govt. authorities. These activities were carried out with the active co-operation of members".

Mr. Parikh was happy to note that the Association was able to move into its own office premises. He said that the Association was planning to have a reference library. Commenting on the new import export policy recently announced Mr. Parikh felt that "the Government is determined to give a firm thrust to exports by announcing liberal import/export policy. Number of items have been added to the OGL list. However a condition of obtaining prior permission from CCI for items specifically

mentioned in Appendix 6 & 2 & 3 will create a lot of problems to actual users". Issuance of such permission may take a long time, felt Mr. Parikh and it is to be hoped that these impediments would be done away with. In view of the Govt.'s incentives for exports, he requested the members to accept the challenge and rise up to the occasion to increase their exports. The members should utilise the various incentives offered for exports, such as 100% exemption on export profits, exemption of income tax etc., he concluded.

Mr. Bhuva's Speech:

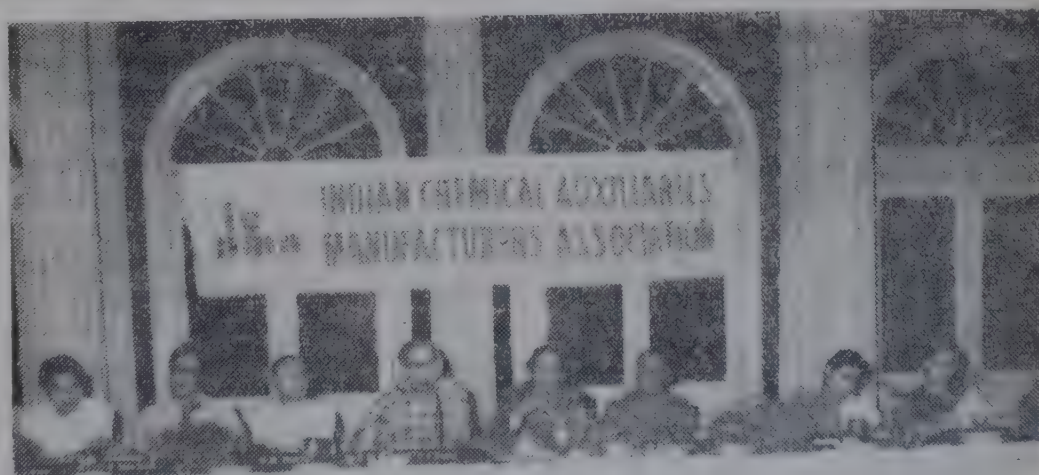
The outgoing president Mr. Chandrakant Bhuva in his speech lamented the condition of the industry today. He said:

"The Government of India has agreed to give a grant to establish an R & D Laboratory by the Association, for which we have made Mr. Deepak Bhimani the Chairman and a Committee has been formed to look into the feasibility and implementation of the same. I am sure, that the incoming President will take all the interest to ensure that this project is established.

"I have certain important points to make especially for raw materials which our chemical auxiliaries manufacturers are mainly concerned

with. To cite a few examples, availability and the supply/demand of vegetable oil has been so erratic in the last 2 years, that the entire range of raw materials based on the above products have become either scarce or their prices prohibitive. To cite a few data, in the year 1971, the production of vanaspati was 590,000 tonnes, refined oil 47,000 tonnes and Hardened Oil 46,000 tonnes. In the year 1971 & 1972, we have not imported any vegetable oil. Subsequently, our production of vanaspati and vegetable oil had dropped all the way until 1976, thereby making the beginning in imports of vegetable oils, which in the year 1976 was 15.42 crores.

"You will see from the data, although there is increase in production, imports have risen very sharply and this has taken place all the way till the year 1984. India has been one of the largest producer of groundnuts and its oil, but it is a matter of regret that taking into account the production of groundnut oil in the year 1980 as 47,302 tonnes, it has declined to 43,201 tonnes in the year 1984. Since groundnut oil is one of the major edible oils in the Western Zone, shortage of such basic edible oils due to insufficient rainfall has made the Government to import large quantities of other



Dr. P.M. Bhargava (fourth from left), Director, CCMB, Hyderabad addressing the members of ICAMA. Also in the picture (from left to right): Dr. Lalji Singh, CCMB; Dr. U.T. Bhalerao, Deputy Director RRL Hyderabad; Shri S.K. Parekh, President-elect ICAMA; Shri C.I. Bhuva, President ICAMA; Dr. P.B. Sattur, Deputy Director, RRL, Hyderabad; Dr. (Mrs.) S. Sinha CCMB and Mrs. C. Chakrabarti CCMB.

substitutes such as palm oil, palm kernel oil, palm fatty oil, etc. for edible and non edible purposes. The basic idea behind taking such an example is that, a country as large as India, with a very large population, and just 2 or 3 insufficient rainfall, can change the entire structure of the economy. Just take for example American economy, where although trade deficit is of the order of US \$87 billions, the common man gets his food and the basic necessities at a price almost the same as that it was in the year 1980 or may be still earlier. Other countries with such huge deficit can still manage to provide the basic necessities as compared to our economy, where a little change in the monsoon can change the entire economic scenario and increase the inflation to double digit figures. Why can't we have such a stable economy where at least the basic necessities can be available at a very economical price to the common man. It is not difficult, but it is the planning which has put the entire economy in doldrums starting from vegetable oils, petrochemicals, polymers, textiles, even iron and steel.

"We are permitting production of heavy motor vehicles in order to bring about competition. This is well deserved move. But look at the state of this industry today. Two wheelers are available at discount and by all sorts of incentives, heavy motor vehicles are available at your door step with huge stocks lying with major producers, and light motor vehicles may soon come to that stage. Can we afford this sort of economy, where large stocks of finished goods remain idle and huge amount of capital remains blocked, thereby depriving others of subsidised finance for better use?

"Similarly, has been the case of luggage industry. You find that today various producers of luggage, bytes and software offer discount all the way from 40% to 50% just to get rid of their large inventories. The idea of industrial licencing was basically mooted to plan industry in every sector, so that there is a balance in supply and demand and that the ultimate benefitter is the consumer, industry and the National Exchequer. This could also be one of the methods of ideal utilisation of finance which is today the most expensive commodity. But looking to the state of industry as mentioned

above, it is very difficult to say that, whether there has really been any planning for issuing such licenses and creating such excess capacities.

It is very easy to say that 'we should export' or 'our industries do not export', all such slogans can be narrated, but can we really export or can we really compete with even small countries like Taiwan or South Korea for any product. Exports for the year 1987-88 have exceeded Rs. 13,800 crores in a period of 11 months and the Government seems to be full of smiles as there is 24% increase in the value of exports. Trade deficit has thus declined for the 1st 11 months of 1987-88 to Rs. 5,941 crores as against Rs. 6,661 crores for the same period of the previous year. In today's circumstances, when our industry is facing stiff competition from imported raw materials available in the country, due to liberated Import Policy, it is very difficult for us to export, when on the one side, there is competition and on the other side, the indigenous producer is left with no other alternative but to buy indigenous basic raw materials like power, fuel, water at exorbitant prices. If the Government really wishes that exports rise sharply, alternate suggestion would be that Government meet producers across the table for a dialogue and sort out small obstacles which the entrepreneur faces for increasing exports.

I have a list of various industries which are sick and as on 31st December, 1986, there are 714 sick units in the country involving an amount of Rs. 3287 crores. The data which I have given is on organised units in the D.G.T.D. where Maharashtra tops the list with 161 sick units involving Rs. 893 crores and the second grade is given to the State of West Bengal where there are 146 sick units involving an amount of Rs. 79 crores.

Today, we have a large population of unemployed educated youths. These young graduates when they pass their finals, have high ambitions and are full of energy to do something creative. If we could plan their future by giving them the right guidance and incentive for self employment scheme and good jobs, it would be an ideal solution for our unemployed youth. There are so many instances, that we could go into, but what I am trying to pin point is that we lack proper planning right from the basic root

whether it be education, unemployment, population or any subject.

We cannot say that we are still going through various experiments as it is 40 years after liberation, the slogan which one reads in every corner of the country. If it is real liberation, let us go with the correct and pragmatic approach to solve this problem we are facing day to day and ultimately restricting the growth of our economy.

Dr. Bhargava's Talk on the role of Centre for Cellular & Molecular Biology.

Addressing the Association members, Dr. Pushpa Mittra Bhargava Director, Centre for Cellular and Molecular Biology, Hyderabad, introduced his colleagues who had come specially for the meeting. They were: Dr. Lalji Singh who had done fundamental discoveries by using recent techniques in genetic engineering. By using genetic studies, he had predicted that the sex determining chromosomes of vertebrates contained specific repetitive DNA sequences. Dr. Lalji Singh had successfully isolated sex chromosome specific satellite DNA from the genome of female Indian snakes. His findings have made molecular analysis of sex determining genes possible.

Dr. (Mrs.) Somdatta Sinha: is a scientist 'c' at the CC & MB. Her work mainly deals with the analysis of feedback control equations describing epigenetic processes and comparing the general solution obtained by two different methods. She is also concerned with the mathematical modelling of biological processes, computer aided analysis etc.

Mrs. Chandana Chakrabarti: is assisting Dr. Bhargava in organising many scientific meetings. Taking care of various publications of CC & MB, Mrs. Chakrabarti is also acting as PRO.

ABOUT CC & MB:

Dr. Bhargava outlined the various activities of the CC & MB. He said:

"The centre for Cellular & Molecular Biology was set up to do basic research in multi disciplinary areas of modern biology. It is the first institute of its kind set up exclusively to do basic research in biology. The institute's activities are divided into 20 groups, each group headed by a scientist with outstanding reputation. The Institute is provided with Rs. 120 crores worth of modern in-

struments and equipments which are fully used by our scientists. The laboratories have facilities for immunological, micro biological and virological works:

"Eventhough there is a power problem, the institute has been able to manage it. There was not a single day where there was no power. Water facilities are good. The institute has own water treatment plant. It has excellent communication facilities and good space utilisation".

The areas of research at the research institute are gene expression in higher organisms, molecular basis of sex determination, DNA finger-printing, micromanipulation of fish and mouse embryos, production of mono sex fishes, membrane structure and transport across membranes, molecular basis of malignant transformation, genetics of osmoregulation, molecular biology of micro-organisms from Antartica, reproduction and reproductive endocrinology, structure and conformation of proteins and nucleic acids and their interactions, study of integrated biological systems using photo acoustic spectroscopy, mathematical modelling of biological processes, computer-aided analyses of biological data such as relevant nucleic acid and protein sequences from data bank, synthesis of oligonucleotides and peptides, tumor immunology, tumor heterogeneity, and ultrastructural studies.

DISCUSSION:

There was an interesting question & answer session ensuing Dr. Bhargava's talk. To a question regarding bacterial problems of chemicals supplied to ONGC, Dr. Bhargava suggested the use of sodium fluoride to avoid this problem. To a question regarding the detection of chemicals of carcinogenic nature, Dr. Lalji Singh replied that various tests are available for an early detection. Ten years from now, he was sure, that diagnostic kits would be available.

ROLE OF RRL, HYDERABAD

Dr. P.B. Sattur, Deputy Director of RRL, Hyderabad and Dr. U.T. Bhalerao of RRL, outlined the various research activities conducted at the RRL laboratory.

In his talk Dr. Sattur said:

"The Regional Research Laboratory, Hyderabad, has a staff of about 1,200 people, 350 of them are research scientists. The remaining belong to the infrastructure sections like,

workshop, analytical laboratory, administration, accounts etc. The total projects budget is of the order Rs. 6 crores per year. We have clearly identified areas of research and development and interact with the CSIR, Govt. of India, Mission projects. The areas of work mainly deals with agrochemicals, drugs, oils and fats, coal, organic coatings, polymers, process developments, simulation, optimisation, mechanical engineering, design and development and catalysis.

"The R & D programmes include development of technology for well identified pesticides to meet the country's requirements. Safe application of pesticides and development of pesticidal formulations are other major areas of research.

"The main emphasis has been on the development of technologies and production techniques of monocrotophos, NBI, DDT, Diethanol etc. The annual turnover of the processes development in RRL for the industries is in the order Rs. 2,920 lakhs.

"In the field of biology, work is being done in the fields of toxicology, entomology, and pesticide formulation. Biological control of silk worm production is one of the main tasks today. In the drugs field, we are working on the development of technologies of anti-bacterial drugs, cardiovascular drugs, Blood pressure lowering drugs etc. Another important project is the development of a new process for Vitamin A. We have many work projects on many organic chemicals and intermediates. In the area of oils and fats, the R & D programme includes developing processes for processing ground nuts, soyabeans, rice bran oil, etc. These are some of the priority projects. Gasification of coal, synthesis of liquefaction of coal, conversion of coal to liquid fuels etc. are the current programmes in hand. Development of catalysts for ammonia conversion, oxy chlorination are also under study".

Dr. Bhalerao: In his talk noted that the RRL had strong industrial process development group in the fields of pesticides, drugs and specific organics. In many of the process developments, RRL itself undertook basic and detailed engineering and offered a complete technology to any entrepreneur.

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CAMA AGM:

Traders voice must be heard

Mr. Yogendra P. Trivedi, an eminent advocate and tax consultant, exhorted the members of the Chemical & Alkali Merchants Association (CAMA) to raise their voices against the wrong policies of the Govt. Forces of liberation had started. Every segment of the society should see that its voice was heard & felt in the government circles. Mr. Trivedi was the Chief guest at the 32nd annual general meeting of the CAMA. Earlier the outgoing president of CAMA, Mr. J.C. Parekh outlined the achievement of the Association.

Mr. Trivedi's Speech

Inaugurating the 32nd AGM, Mr. Trivedi said (in part):

"In today's economic scenerio, a sence of subdued optimism has descended on our mental thinking as against the august dynamism, benign optimism which we had when we gained our freedom. When India became free 41 years ago, it was described as a great romance in history. Here was the country which had a wealth of talents, which had adopted a democratic system. The emerging India was on the throes of slavery and poverty. It was the opinion of John Galbraith that India was a functioning anarchy. Some eminent person once remarked that he did not understand how this country with its beautiful Indo-Gangetic belt (the breac basket of entire world) should be so poor and experience repeated food shortage.

Today when we compare ourselves with the South East Asian countries, we are far behind despite having excellent talents, resources etc. The reasons for this are two fold. The first reason is the industrial policy resolution of 1946. This had created a Public Sector which became a total monopoly of the State. Nobody could touch it. More than Rs. 50,000 crores have been invested in this sector. The net profit of this sector is only Rs. 60 crores. If we were to deduct the profits earned by the ONGC, other public units are running into huge losses. In such kind of monopoly, the worst sufferers are the consumers. It is imperative that the spirit of com-

petition should percolate in all sectors".

Touching upon the current economic scene, Mr. Trivedi said:

"The economy will accelerate itself only when there is an increased production with profits. According to the renowned economist Keynes profit is the only thing that keeps the production moving. In today's scenario, with a non-plan expenditure accounting Rs. 47,000 crores, the government collects money to pay back interests, non-productive expenditure. Why should we have repeated droughts and floods? Lack of proper harnessing of natural resources and bad water management would lead to a disastrous state.

"The Indian economy is in shambles. The inflation is rising continuously. The concept of preparing cost Index is faulty because many hidden contributory items are not taken into account. Unbridled corruption is the worst thing that can happen to a developing country. Wrong taxation policies encourage corruption.

"To curb the growth of black money, it is imperative to enact simple tax laws. Ideally tax laws should be simple and easy to understand; they should be uniform; and equity should be maintained.

"Basically we are talented people who can make changes. The forces of liberation have started. Every segment of the society must raise its voices and be sure they are heard and felt" Mr. Trivedi concluded.

**SPEECH OF THE OUTGOING
PRESIDENT MR. J.C. PAREKH:
ECONOMIC OUTLOOK:**

Today Indian economy is at a cross road. The economy is like a over worked and tired face trying to maintain it's radiant through cosmetic surgery. Planned economy, liberal policies of the present Government, radical laws to protect labour, increased consumerism of the middle class, Westernisation of the living standards of urban rich, talk of marching to dream land of 21st century etc. gives the Indian economy a bright outlook.

CAMA OFFICE BEARERS

Mr. S.K. Joshi has been elected the President of the Chemical & Alkali Merchant's Association Bombay for the year 1988. The following are the other members:

Mr. R. Natarajan : Vice President
Mr. A.K. Doshi & } : Hon. Secretaries
Mr. J.H. Sheth }
Mr. D.T. Gandhi : Hon. Treasurer
Mr. S.L. Sayer : Broker Committee Member

There are other twelve committee members.

But on closer scrutiny, the India economy is severely handicapped because of factors enumerated here:

1. Severe drought conditions since last three to four years in many parts of the country has pushed the prices of agricultural produce including agro-inputs to a new height.
2. Constant rising graph of inflation eating away any increase in the real income of the people.
3. Red tapism and corrupt practices in the almost every strata of the society increasing the indirect cost of goods and services.
4. State agencies tendency to constantly search for new sources of income through taxes without any care for the people's ability to pay.
5. Heavy Government expenditure on the maintenance of law and order and non-plan expenditure.
6. As some prominent economists pointed out the staggering national debt which is being paid at Rs. 2,24,000 crores and the total interest burden at Rs. 14,100 crores.

These and other factors which are not possible to enumerate here because of lack of time and space, are slowing down the rate of progress to minimal.

Because of the nature of economy we traders find it very difficult to meet our commitments. With the increase in cost of goods and services our investment in the business

es up without any matching re-
rn on our investments. Our
nds remain blocked for a very
ng period because of industries
ability to pay for their purchases
time.

Because of high rates of bank
terests and service charges we can
ast afford to borrow from the bank.
igh rate of taxations forced us
o take out the funds from our bu-
ness and to invest the same in na-
onal saving schemes. Against all
ese odds we as business communi-
y have never lagged behind in do-
g yeomen service to the commer-
e and industry.

IMPORT EXPORT POLICY

The three year Import Policy an-
nounced by the Government has
een expanded to 745 more items
n the OGL list. The Policy also
akes an attempt to reduce multi-
plicity of schemes and to make the
operation more effective on the
front. A significant feature of the
new policy is the recognition of
he role of indirect export provid-
ng that all supplies made by indi-

geneous producers against duty free
licences would be treated as deem-
ed exports. On the whole, the ex-
port import policy liberalises the
imports of capital equipment ma-
chinery and components with a view
to boost up the export.

SALES TAX

The amendment to the Bombay
Sales Tax Act, providing the levy
of penalty and interest have far
reaching implications on trade com-
merce and Industry. My Association
has protested against these provi-
sions and requested for the with-
drawal of these amendments. There
is no response so far from the Gov-
ernment.

The Bombay Sales Tax Rules have
been amended revising the periodi-
city of return monthly, quarterly
and/or yearly as per the annual tax
liability. The annual tax liability
with which the periodicity of the
return linked is the tax liability un-
der the Bombay Sales Tax Act only
and does not include that under the
Central Sales Tax Act.

Some further amendments have
been brought into effect recently
by which sales of goods on declara-
tions by giving Form No. 14 and
Form No. 15 on which the basic
Sales Tax is not leviable by virtue
of Section 8 (iv) and Sales of Goods
which were wholly exempted from
Tax under section 41 will now at-
tract the levy of Turn over tax.

The Government has also amended
the definition of dealer, manufac-
turer and thereby widening the
scope for sales tax.

The trading community has been
demanding abolition of Sales Tax
by replacing any other mode of
revenue. The traders are doing the
Government's job by collecting
Taxes from the buyers and deposit-
ing with the Government. It has
also always been our demand for
simplification of the procedure to
relieve the trade from hardship
and harassment.

Our demand and efforts have
gone in vain. Day by day more
items are being brought under Sales
Tax as well the provisions for pe-
nalty interest and procedures for
maintaining accounts are being
made more and more stringent.

I request our Chief Guest to give
his views on the recent amendments
and necessary guidance.

PROFESSIONAL TAX

The Government has clarified that
the Registered Partnership firms
holding registration certificate under
Bombay Sales Tax Act, are not now
liable to pay profession tax from the
year 1985-86 onwards. Firms hold-
ing registration certificates under
the Bombay Sales Tax Act, have to
send their applications for cancel-
lation of enrolment certificates.

The entry levying profession tax
is amended to exempt employees
having their salary upto Rs. 800/-.

I propose that the exemption limit
should be raised upto the salary of
Rs. 1,500/- in this high cost of liv-
ing.

OCTROI

We all know that the Govern-
ment has committed that the octroi
will be abolished in the State of

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Maharashtra latest by 31st May 1988. As a sequel to this decision an expert Committee known as Kasbekar Committee has been appointed to recommend alternative source of revenue to replace octroi. The Committee is reported to have given its report proposing to replace octroi by a single point Entry Tax with adequate safeguard against harassment.

There is apprehension in the minds of some of the people that introduction of entry tax will cause much more harassment and difficulties. To clear this apprehension, the action Committee as well my and many other Trade Associations have submitted representations suggesting that the entry tax should be single point tax, levied at the lowest possible rate and Commodities used by the poor should be exempted. Items which do not come within purview of octroi should not be included in entry tax and that products undergoing multiple process should not have multiple tax but only single tax. There should also be provision to constitute review council representing trade and industry.

I shall now dwell on the activities of the Association.

ANTOP HILL WAREHOUSING PROJECT

In pursuance to the stay order from Supreme Court to maintain status quo, the State Government has ordered a temporary halt to the Antop Hill Warehousing Project till it studies the report of the Committee appointed under the Chairmanship of Dr. R.K. Garg and take an appropriate decision.

We are sorry to take note that the Government is not taking any decision on the report which was submitted to it in the middle of 1987. We strongly feel that the State Government should act speedily in the matter as crores of rupees collected from the traders are blocked without any return. At present the whole project is at standstill.

Our own views on the transportation, handling and storage of hazardous and extra hazardous chemicals are made known to the concerned authorities many a time and we feel that it will not be out of

place to put in brief the same here once again.

However hazardous a material is, it does not pose any danger to the surrounding atmosphere and the people and property if it is packed in safe containers which can withstand rough handling and transportation. Properly handled and safely transported to be delivered and stored in a godown which is well equipped to prevent fire, protect the material from exposure to unfriendly weather rains and flood. We can cite the example of flying planes which also carries highly volatile and inflammable fuel without posing any threat to the people and property over which it flies.

Even though the Indian Merchants Chamber and the constituent Associations are parties to the project they have not been given the copy of the Garg Committee report. The

Government has not cared to respond to our representations nor given appointment to represent our difficulties and case. As a last resort the Antop Hill Company will have now to consider to take legal action in the matter to solve the deadlock.

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The Special General Meeting of the Association, had resolved to the right title and interest in possession of the office Premises amounting to 700 sq. ft. at the price of Rs. 1,65,000/- to the Chemical and Alkali Distributors Ltd., in consideration of the said company withdrawing its activities from the remaining portion of the office Premises. I say for the information of members that the agreement of transfer of the premises as aforesaid is executed.

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Seminar on textile processing held at Ichalkaranji

A half-day seminar was held on 20th Feb., 88 at D.K.T.E. Society's Textile Institute, Ichalkaranji, under the joint auspices of Textile Institute, Ichalkaranji and the Textile Association (India) Ichalkaranji-Miraj Unit. The Seminar was attended by about hundred delegates from Ichalkaranji, Madhavnagar, Jaysingpur, Belgaum, Kolhapur etc. The seminar was organised with the help of C.D. Corporation and its allied group of Industries, Bombay.

Professor D.B. Ajgaonkar, Principal of Textile Institute, Ichalkaranji welcomed the delegates. He traced back the history of the Textile Institute and its association with the C.D. Corporation through Shri S.M. Doshi, Technical Executive of the C.D. Corporation. Shri. C.V. Somaiya, Managing Partner of C.D. Corporation had specially come from Bombay to inaugurate the seminar and participate in the proceedings. He was introduced by Prof. S.K. Chinta the convenor of the seminar. Shri

Somaiya declared the seminar inaugurated. He said that he was very much impressed by the performance and progress made by the D.K.T.E. Society's Textile Institute under the guidance of Shri K.B. Awade, Chairman of the society in a short period of five years. Shri Somaiya then handed over a cheque of Rs. 25,000/- on behalf of the C.D. Foundation Trust as a part payment of a total financial supply of nearly Rs. 1.25 lakhs for the development of Degree Course in Textile Chemistry of Shivaji University at Textile Institute, Ichalkaranji and naming the Institutes Textile Chemistry Laboratory/Pilot Plant as C.D. Foundation-Endowment Textile Chemistry Lab/Pilot Plant. This course at Degree level can be taken by the students who are qualified by passing H.S.C. examination with Physics, Chemistry and Mathematics (for the course at BUDCT the qualification is B.Sc). It is a four year degree course preparing students in Textile Wet Process-

ing to take up jobs in wet processing sections of a textile mill or in wet processing houses in decentralised sector. The C.D. Foundation Trust has taken interest in developing this course at Ichalkaranji, a textile centre in Maharashtra, by providing funds for the equipments, chemical dyestuff etc. in the initial stages. Textile Institute is run by the D.K.T.E. Technical Education Society under no grant scheme of the State Government since 1982. The Society is supported by the co-operative spinning mills, co-operative banks and through the donations from the public and municipality of Ichalkaranji.

A good gesture of donation by Shri. C.V. Somaiya through the C.D. Foundation Trust was very much appreciated by Shri K.B. Awade. He said that though the birth of this new course in Textile Chemistry at degree level has been given by the Society, it is gratifying to note that C.D. Foundation Trust, Bombay has come forward to nurse the course. The Laboratory would be named as C.D. Foundation Endowment Textile Chemistry Laboratory. He thanked the Trustees of C.D. Foundation Trust for their donation to a Technical Education Society working in a semi-rural area.

A key note address, by Shri Shri radhbhai Jain, Managing Director, the Madhavnagar Cotton Mills Ltd., Madhavnagar was read in his absence by Prof. Ajgaonkar. The keynote address reviewed the situation of Textile industry and suggested some measures for solving its problems. Professor C.D. Kane, Vice-Principal of Textile Institute thanked Shri Somaiya and others for helping in organising the seminar and giving a helping hand to the Textile Chemistry Course.

After the tea break the Technical Sessions of the Seminar started and were concluded with a panel discussion which was very lively. The seminar ended at about 7.00 p.m. when High-Tea was hosted by C.D. Corporation, Bombay. The function was a grand success. Shri S.M. Doshi, Shri S. Sundaram and Prof. A. Wasif presented three papers in technical sessions.

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OIL NEWS

Scope for use of natural gas in cement industry

A plan to utilise natural gas in the cement industry, as a substitute for coal, is now receiving the attention of policy makers in the Government.

The National Council for Cement and Building Materials (NCB), which functions as an autonomous body under the Industry Ministry, has just completed a study, which concludes that increasing availability of natural gas in different areas of the country in future and its emergence as an important alternative energy source hold out possibilities of its use in several cement plants.

The study will soon be submitted to the Ministry, which will process its recommendations for necessary action like formulating policies that encourage use of natural gas by cement plants. If that happens, natural gas will find one more major industrial use in the cement industry. So far, it is planned to be used in fertiliser manufacture and power generation.

The NCB study, initiated at the instance of the Ministry, suggests that to begin with, cement plants located nearer the gas fields in Andhra Pradesh, Saurashtra, Assam and nearer the HBJ pipeline in Rajasthan and Uttar Pradesh could benefit from this. At a later date, those cement plants located nearer the national gas grid and deficient in the supply of quality limestone can utilise the natural gas.

Cement plants in the Soviet Union and Pakistan are already using natural gas as fuel. In India, however, coal has all along been the cement industry's major fuel except for a brief period in the early seventies, when availability of cheap oil caused a slight shift towards oil. But with the steep increase in oil prices in 1973, the emphasis reverted to coal as the main source of energy in the cement industry.

According to the study, natural gas is emerging as an important alternative energy source on the country's

commercial energy scene. An area-wise break-up of the production potential of natural gas, based on proven reserves, puts the availability at 66 million cubic metres per day (MCMD), of which 25 MCMD will be used for production of fertilisers, 15 MCMD for power generation and the remaining for replacement of liquid fuels in boilers, as cooking fuel in homes and in other industries.

It is also pointed out that the total gas reserves as of now are 906 billion cubic metres, which is expected to rise to 1,231 billion cubic metres by the end of the century. However, only 10 per cent of gas reserves is established. But the Oil and Natural Gas Commission has projected an increase in the country's natural gas production from 20 MCMD in 1984-85 to 40 MCMD by the end of the Seventh Plan and 130 MCMD by the turn of the century.

According to the study, there are several advantages of using natural gas in place of coal with high ash content as fuel in rotary kilns. For instance, there is total freedom from ash contamination and hence there is scope for exploiting marginal grade limestones, implying in turn, possibility of setting up of cement plants in the north-eastern region. This will improve thermal efficiency by about 1.5 per cent and increase production by 5-8 per cent. There is also scope for increasing addition of pozzolona in portland pozzolona cement (PPC) by about 7.5 per cent.

Among the other advantages are complete elimination of coal grinding, resulting in saving of electrical power to the extent of 7-11 kwh per tonne of cement and better control in pyro-processing leading to better quality of clinker and avoidance of transport of high ash coal over long distances and the resultant saving and relief to the Railways.

Against these advantages, there will be a very small increase in cost due to the need for addition of siliceous material (clay) to compensate for the ash from coal, which is absorbed in the cement clinkers.

Another advantage will accrue if co-generation of power is resorted to by using natural gas first in gas turbines to produce power and then using the exhaust gases from the turbine in the rotary kiln along with virgin natural gas to boost the temperature inside the kiln to the required level. Such co-generation could provide the required captive power to the cement plants in question and to that extent relieve them of the uncertainties of power supply from State Electricity Boards.

The study has identified nine cement units, located nearer gas fields. These are (with annual capacities in brackets) Porbander Cement Works, Porbander (two lakh tonnes), Saurashtra Cement and Chemical Industries, Ranavav (8.63 lakh tonnes), Shri Digvijay Cements, Sikka (10.25 lakh tonnes), Andhra Cement, Nadikudi (2.5 lakh tonnes), Andhra Cement, Vijayawada (2.4 lakh tonnes), Kistna Cement Works, Kistna (2.16 lakh tonnes), Bokajan Cement Works, Bokajan (2 lakh tonnes) and Mawmluh Cherra Cement, Mawmluh Cherra (2.84 lakh tonnes).

Similarly, seven mini-cement plants with a capacity below 200 tonnes per day has been identified as those which have the potential for using gas as fuel because of their nearness to the gas fields. These are Coromandel Cement, Deccan Cements, Kakatia Cement, Nagarjuna Cements, Parthasarathy Cements, Suvarna Cements, (all in Andhra Pradesh), and Kamdar Cement, Veraval, Gujarat.

There are about 20 identified cement plants, which could use natural gas when the national gas grid comes into being. These plants could use the gas as they are particularly handicapped by deficient cement grade limestone reserves and located far away from coalfields, but proximate to the gas grid. These units are (with their annual capacity in lakh tonnes given in brackets) Bhupendra Cement Works, Surajpur (4.05) Gagal Cement Works, Gagal (5.60), Charkhi Dadri Works, Charkhi Dadri (2.39), Udaipur Cement Works, Bajaj Nagar (4), Lakh-

eri Cement Works, Lakheri (3.22), Jaipur Udyog, Sawaimadhopur (10), Birla Jute Manufacturing, Chittorgarh (9), Nayagaon Cement Works, Naya-gaon (4), J.K. Cement Works, Nimba-hera (11.40), Mangalam Cements, Mo-rak (4), Mysore Cements, Ammasand-ra (5.10), Madukkarai Cement Works, Madukkarai (3.77), Coromandel Ferti-lisers, Kalamala (10), Priyadarshini Cements, Tadapatri (4), Yerraguntla Cement Works, Yerraguntla (4), Pan-

yam Cements and Mineral Industries, Panyam (5.31), Madras Cements, Thulukkappatti (5.25), Tamil Nadu Cement Corporation, Alangulam (4), India Cements, Sankaridurg (6) and Vikram Cements (5).

The study shows that the use of natural gas will work out to be econo-mical or at least equal to that of coal, when the price of coal is Rs. 400 per tonne and that of gas is Rs. 1,000 per 1,000 NM³.

Project delays leave gas field unused

Massive investments made in the south basin gas fields are associated processing facilities downstream of the HBJ pipeline will remain heavily under-utilised due to serious delays in commissioning of four gas-based fer-tiliser plants and three thermal power plants under implementation by the National Thermal Power Corporation.

According to a report of the minis-try of programme implementation, there

was an urgent need to firm up an al-ternate marketing plan for the utilisation of the available gas.

The report said substantial quantity of associated gas from Heera and other gas fields in Bombay High was still being flared due to serious delays in sanctioning of investment for the con-struction of submarine pipelines for bringing the gas onshore where ready market was available.

The report said the LPG reco plant of the ONGC at Hazira had l reported completed by December 1 but was yet to achieve stable pro tion.

The polyester staple fibre proje Bongaigaon (BRPL) was also repo complete by 1987 but was facing ous marketing problems due to cost of production and was opera at a fraction of its rated capacity.

The report said a major problem project implementation in the petr um sector comprising 26 projects a total anticipated cost of Rs. 10, crores was delay in supply of eq ment by Indian vendors.

The policy of indigenisation not resulted in significant reduc in overall import content as most the materials and high-tech comp ents and equipment were still imp ed.

The situation was not very diffe in many other sectors like coal power as time for procurement of ported items was very long. De were therefore endemic in supply equipment to projects by the pu sector.

The report said the scenario of plementation of projects costing 100 crores and above revealed endemic problem of time cost o runs in majority cases.

As on January 1988, of the projects 78 projects had been dela with reference to original time sch ule.

The anticipated cost of the 78 jects had escalated from the appro cost of Rs. 26,914 crores to 46,039 crores which was as much 71 per cent.

Similarly, the anticipated cap cost of the remaining 46 proje which had not yet reported delays, now estimated to be of the order Rs. 18,133 crores against the orig cost of Rs. 21,216 crores showing escalation of 17 per cent.

The report said it was thus ap ent that the state of the art of pro management in several sectors not satisfactory.

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K. G. production by year-end

Mr. Brahm Dutt, the minister for petroleum and natural gas, said that the off-shore well GS-16-5 in the Krishna-Godavari basin, would be put on production by the end of this year. The well yielded about 5000 barrels per day of oil and 1.6 lakh cubic metres of gas per day during initial testing.

The minister, who was addressing the Consultative Committee of MPs attached to his ministry said crude oil production in the GS-16 structure was expected to be around one million tonnes per year. It was noted that natural gas had also been struck recently at the Chintalpalli well in the Krishna-Godavari basin.

Oil and gas had also been struck in Annilam-1 in the Cauvery basin. The well produced oil at the rate of 150 barrels a day and gas at the rate of about 3000 cubic metres per day, during testing.

According to an official release, the minister also referred to the progress of the HBJ pipeline. He said gas was made available to the Indo-Gulf fertiliser plant at Jagdishpur on April 15, this year. Earlier, gas was delivered for the IFFCO fertiliser plant at Aonla in March 16.

The minister announced that the government had decided in favour of bringing gas to Delhi to feed the Delhi Electric Supply Undertaking, replacing diesel and naphtha. This inter-substitution of fuel would have a favourable impact on the foreign exchange position.

He said that enroute to Delhi, the gas pipeline would supply natural gas to the National Thermal Power Corporation's gas-based power plant at Dadri near Bulandsahar. The pipeline would also supply gas to the Indian Explosives Limited fertiliser plant at Kanpur.

Responding to a query, he said that it was proposed to vest the responsibility of processing, marketing and transportation of gas with the Gas Authority of India (GAIL).

Referring to the government efforts to attract foreign oil companies to explore for oil in the Indian offshore, the minister said that so far six contracts had been signed. The latest was signed in April with Chevron-Texaco for exploration in an offshore block in the Mahanadi basin. The contract with the foreign oil company was signed

by the government and Oil India Ltd.

He underscored the need to establish additional refinery capacity in the country in view of the growth in the consumption of petroleum products. The capacity would need to be doubled in the next 12 years, he said. For the present three new refineries were planned at Karnal (Haryana), Mangalore (Karnataka) and Assam which would add 11 million tonnes by way of capacity. The matter had been posed to the Planning Commission.

The minister informed members that the Bongaigaon Refinery and Petrochemicals Ltd. had started trial production of polyester staple fibre plant in April. Commercial production was expected to commence this month.

ONGC UNIT DEVELOPS SHOT-HOLE DRILLING RIG

The Oil and Natural Gas Commission's (ONGC) central workshop at Baroda has developed a prototype heavy duty shot-hole drilling rig. It is being offered to indigenous manufacturers for fabrication within the country.

The shot-hole drilling rig is an integral part of the exploration process. It is used for lowering dynamite charges in the hole drilled through this rig. The normal depth of this hole is about 50-100 metres. The charge lowered is then blasted which sends shock waves into the sub-surface, which on reflection depending upon the underground geology are interpreted to reveal the rock formations.

The development of the prototype of the heavy duty shot-hole drilling rig is yet another example of import substitution through inhouse efforts by the central workshop, Baroda.

In fact, this prototype is an improved version of the CWS-100 heavy duty shot-hole drilling rig being already manufactured by the Central Workshop. The indigenous manufacture of one shot-hole drilling rig helps in bringing about a foreign exchange saving to the tune of Rs. 16 lakhs. Till now 13 rigs of CWS-100 type have already been successfully manufactured by the Central Workshop, thus bringing about a saving of Rs. 2.08 crores in foreign exchange.

The indigenous cost of one heavy duty rig including the cost of chassis is Rs. 7.5 lakhs (approx.).

The present lot of shot-hole drilling rigs available with ONGC are of vari-

ous capacities. The rigs are equipped with mechanical as well as hydraulic systems and are truck mounted and have different capacities when evaluated in terms of drilling speed, operational convenience and mobilisation in muddy conditions.

This latest model would be able to handle additional load and would have better load bearing capacity for the mast. It would also have increased mud hydraulics in terms of pressure and discharge for speedy operation, an additional hydraulic system has also been provided for release of stuckups.

The Central Workshop was established in 1963 to undertake major overhauls and to provide repair cover to all the drilling and production equipment in operation in the fields of Gujarat. The workshop is now placing greater emphasis on manufacturing whole systems and equipment rather than spares alone.

Under the import substitution programme, the Central Workshop, Baroda has so far saved over Rs. 35 crores in foreign exchange by fabricating heater treaters, indigenous working rig, separator, bottom hole winches, hydraulic wire line winches, degreasers and desilters, shot-hole drilling rigs, pressure vessels and host of other items for operation in the field.

KOTHARI SUGARS PLANS RS. 15-CR. PLANT AT MANALI

Kothari Sugars Limited is putting up a Rs. 15-crore plant at Manali near Madras for the manufacture of polybutene, the main raw material for making special grades of lubricants and various compounds that go into the production of electrical items.

The company is teaming up with a U.S.-based company for the supply of know-how for the diversification project. The U.S. company will provide the process licence and basic engineering package for manufacture of polybutene. Steps are being taken to tie-up finances for the project.

The Union government has already permitted the Madras Refineries Limited to supply the raw material.

MRL and Kothari Sugars will soon be signing an agreement for the purpose.

The company has also received letters of intent for the manufacture of hydrogen peroxide and nitroaromatics.

Negotiations are underway with process licensors abroad for obtaining latest cost effective technologies.

TRANSFER OF RESPONSIBILITIES:

Govt. inclines towards GAIL

Has the government finally decided to come out openly in support of the Gas Authority of India Ltd. (Gail) over the transfer from the ONGC, of the processing, marketing and transportation of natural gas? Obviously so, if the reply given by the minister for petroleum and natural gas Mr. Brahm Dutt, at the consultative committee meeting of MPs attached to his ministry is any indication.

The minister told a member that "it is proposed to vest the responsibility of processing, marketing and transportation of natural gas with Gail, in phases." Gail, he said, is already implementing the HBJ gas pipeline project and is supplying gas to NFL's fertiliser plant at Bijaipur and to Ifco's fertiliser plant at Aonla. It would supply gas to other consumers along the pipeline.

The minister's response assumes importance in view of the fact that the Oil and Natural Gas Commission (ONGC) has been maintaining that the letter which it received recently from a joint secretary about the transfer to Gail, was a mere D.O. letter (semi-official). Accordingly, it could not be taken as a government order.

Be that as it may, the minister's reply, sources feel, should erase any doubt that the ONGC might harbour about the letter it received two months ago asking it to transfer its responsibilities of processing, marketing and transportation of natural gas to Gail, albeit in phases. In fact, this issue had become the bone of contention between the two public sector organisations.

While Gail maintained that as per the decision to set up the Gas Authority in early 1984, this was one of the responsibilities it was required to shoulder. As, at that time it was busy working on the HBJ pipeline, the transfer of responsibility was put off. Now that the pipeline is nearing completion, the time for the transfer had come, it felt.

The ONGC, on its part, while willing to release hold on some of the areas connected with gas, contested

Gail's claim. Its chief was quoted recently as saying that Gail wanted to have the baby without going through the labour pains.

Whatever the situation now, the fact that the minister of petroleum and natural gas has himself given indication of his thinking, should cheer up Gail on the one hand while unsettling ONGC, on the other.

Of course, the final round between Gail and ONGC is far from over. The issue apparently will continue to drag on till like all other difficult areas of decision making, it will be put up to the Prime Minister for the final solution, sources feel.

RAMA PETROCHEM PLANT GOES ON STREAM

Curtain has rung down on bulk imports of yet another chemical following the successful commissioning of Rama Petrochemicals' 50,000-tpa methanol plant in Patalganga, Maharashtra.

Methanol has thus joined the list of important chemicals whose import is being given up by the State Trading Corporation (STC) following large additions to domestic capacities. Other chemicals whose imports ceased in recent times include linear alkyl benzene (LAB) and phenol.

Rama Petrochemicals has reported a high level of 99.9 per cent purity for its product. If this can be sustained, this will give the company a marketing edge over other producers. The company attributes this to its manufacturing process, based on "zero power" concept, incorporating the latest low-pressure technology of Lurgi GmbH of West Germany, world leaders in the field.

According to Mr. Ashok J. Ramsinghani, Managing Director, the product has been well-received in the market and the company is presently making bulk supplies to a host of chemical manufacturers including Hindustan Organic Chemicals, Cibatul, Konkan Chemicals, Indian Dyestuffs Industries, Pentasia Chemicals and the like. DMT manufacturers have also received the product well, he said.

With Rama plant going on stream, the country has almost become self-

sufficient in this vital industrial raw material. The State Trading Corporation used to import 55,000 to 60,000 tonnes every year. "Considering the prevailing high prices of methanol in the international market, the country will save around Rs. 15 to Rs. 17 crores in foreign exchange," according to company officials.

Currently, methanol is sold at the pooled price of Rs. 5,300 per tonne which, with various levies, adds up to almost Rs. 6,400. STC's imports via the pipeline are expected to arrive by June-end. The price pooling system is expected to end in July, signifying an increase in price.

The total methanol demand in the country is placed around 1,60,000 tonnes. The four indigenous units — Rashtriya Chemicals & Fertilizers, Gujarat Narmada Fertilizers Limited, National Fertilizers Limited and Assam Petrochemicals, together produce around 83,000 tonnes. Assam Petrochemicals is putting up a 100 tonnes-per-day plant. RCF is also modernising its outdated methanol plant. The country would become totally self-sufficient once these projects are completed.

OUTSTANDING MANAGER AWARD FOR DCL ED

The prestigious Ahmedabad management association's outstanding manager of the year 1988 "award has gone to Mr. P. S. Chhabra, executive director of Diamines and Chemicals, Ltd. Baroda.

While selecting him among 16 nominees for the award, the panel judges "has looked into the outstanding contribution by Mr. Chhabra successfully turning around a loss-making unit into a viable and healthy organisation."

The panel noted his contribution in developing people and building a harmonious work environment. He made innovations in performance appraisal system, suggestion scheme, introduction of quality circles, and management by objectives.

300 SSIs SEEK DPCO EXEMPTION

About 300 small-scale industrial units have claimed exemption of their category products from price control under DPCO, 1987, the Industry Minister, Mr. J. Veeral Rao, told Mr. R. Sahu in the Rajya Sabha on May 9.

Additional capacity for alcohol welcomed

Comments the Economic Times:

The decision to allow additional capacity for the manufacture of potable alcohol from raw materials other than molasses has not come a day too soon. Ever since the new alcohol policy was announced in September last, such a move has been aired off and on. In fact, shortly after the policy announcement, a committee had been established to draw up guidelines for the production of non-molasses-based potable alcohol. The plight of industrial users of alcohol continues to be perilous. If the shortage they face is to be overcome, it is imperative to stem the present flow of molasses for potable alcohol. Which means that the government should now expedite the issue of licences for additional capacity.

Welcome as the liberalisation is, equally important from the view-point of curbing illicit distillation is the need to note that the gains will accrue only in the medium term. True, a 30,000 litre project for producing alcohol from tapioca has gone on stream in Tamil Nadu. Technology is available for the production of alcohol from

mahuwa flowers. But the anticipated shift in the flow of molasses to industrial users, once distilleries find non-molasses attractive enough, will take time. Two months ago, the government was "seriously considering" legislation to control distribution of molasses and ensure direct supply from sugar factories to distilleries. It was also contemplating a proposal to allow states suffering from shortage of molasses and alcohol to import them free of duty from surplus states.

Free import of alcohol by deficit states on the other hand is a practicable solution. By holding out a threat to allow duty-free import of alcohol by deficit states, the government brought at least one surplus state to its senses. Uttar Pradesh, which has abundant stocks of molasses and which has imposed an exorbitant export fee, has announced a reduction in the fee for industrial alcohol. So along with a medium term strategy of diverting molasses-based alcohol to industrial users by encouraging the production of potable alcohol from raw materials other than molasses, a short-term strategy to permit a more equitable distribu-

tion of industrial alcohol is equally necessary. Such a step would also help in the reduction of excess stocks with surplus states.

RCF'S DI-METHYL FORMAMIDE PLANT

Rashtriya Chemicals & Fertilizers is putting up a di-methyl formamide plant at its Thal fertilizer unit, district Raigad. The plant with an annual production capacity of 2500 metric tonnes will cost Rs. 6 crores with a foreign exchange component of about Rs. 1.5 crores.

The site for the proposed plant has been earmarked and the commencement of project activities was formally inaugurated by Mr. Duleep Singh, chairman and managing director on May, 5. Mr. Singh disclosed that this will be the first di-methyl formamide plant of its kind in the country which will save foreign exchange worth Rs. 4.5 crores annually.

The plant will use di-methyl amine as a main raw material which is being produced by RCF at its Trombay complex. The carbon-monoxide, the second raw material to be used shall be tapped from the existing Thal ammonia plant.

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COMPANY NOTES

GACL OUTPUT CROSSES 1 LAKH TONNES

For the first time, Gujarat Alkalies and Chemicals Ltd (GACL) has crossed the production of one lakh tonnes per annum of caustic soda during the year ended March 31, 1988, reaching a production of 1.03 lakh tonnes (96,000 tonnes). The higher capacity utilisation of 99 per cent over last year's 93 per cent is attributed to higher plant efficiency and greater market demand.

The production of other chemicals during the year was also higher with chlorine gas at 90,992 tonnes (85,056 tonnes), hydrochloric acid at 89,935 tonnes, (89,806 tonnes) compressed hydrogen gas at 73.3 lakh cubic metres (28.31 lakh cubic metres), and sodium cyanide at 1,570 tonnes (1,410 tonnes).

In its second year of production, GACL's chloromethane plant operated at capacity of 82 per cent (42 per cent) and produced, 8,612 tonnes (4,392 tonnes) of these chemicals, registering an increase of 96.1 per cent over the previous year's production.

The caustic soda flaking unit, which went into commercial production only last year, worked at a capacity of 53 per cent to produce 8,730 tonnes of caustic soda flakes of 99.5 per cent concentration on dry basis. The product received a very good response from the market place.

The sales turnover of the company stood at Rs. 85 crores, registering an increase of nearly 21 per cent over the previous year's turnover of Rs. 70 crores.

During 1987-88, GACL also consolidated its position in the markets abroad. Against the exports worth Rs. 33.43 lakhs in 1986-87, its exports during 1987-88 stood at Rs. 132.97 lakhs, an increase of nearly 300 per cent. The exports consisted of sodium cyanide valued at Rs. 13.34 lakhs (Rs. 11.66 lakhs), to Australia, and chloromethanes valued at Rs. 119.62 lakhs (Rs. 21.77 lakhs) to USSR, Japan, Australia, Taiwan, Philippines, Hong Kong and Malaysia.

GACL has signed an agreement with Uhde GmbH West Germany to obtain the membrane cell technology for the manufacture of caustic soda. To be implemented at a cost of Rs. 39 crores, the project consists of conversion of 50 per cent of its existing mercury cells into membrane cells, leading to a saving of around 1,000 kwh per tonne of caustic soda and elimination of mercury.

RS. 50-CR. HCL FACELIFT PLAN

Hindustan Copper has launched an action plan to modernise the plants and update production technology at a total investment of Rs. 50 crores, Mr. R. S. Misra, Chairman and Managing Director of the company said.

HCL was also planning to set up a 60,000 tonnes continuous cast wire rod plant at Taloja, which would start production by 1989.

He was speaking at a technical workshop on indigenous copper organised by the Indian Copper Development Centre at Bombay.

Mr. Misra said that apart from the significant progress recorded in terms of production, the company had in recent years given equal importance to quality aspects through in-house research and development efforts and assistance from overseas experts.

In the past HCL had been catering mainly to manufacturers of copper alloy semis. With progressive improvement in quality, HCL had started catering to other sophisticated customers like auto-ancillary manufacturers, manufacturers of bare and insulated wires and continuously cast rod, who required copper of better quality.

The performance of HCL during the year 1987-88 has generally been satisfactory. The company has achieved a record production of ore concentrates and copper showing increase of 1 per cent and 7 per cent respectively over the previous year.

Better performance has enabled the company to achieve capacity utilisation of 92 per cent in its mines and 86 per cent in its works. The company as a result has made a small profit this year. The annual production is over 50,000 tonnes per year. Mr. Balkrishna Binani, President of the Indian Non-ferrous Metal Manufacturers' Association, hoped that deliberations at the workshop would help to sort out some of the problems faced by the industry apart from giving useful feedback to HCL.

Dr. L. R. Vaidyanath, Director, Indian Copper Development Centre, proposed a vote of thanks.

MAX INDIA PETROCHEM UNIT IN PUNJAB

Max India Ltd. has diversified into the petro-chemicals and packaging industry by promoting a Rs. 25-crore project to produce

ce BOPP film in financial collaboration with Punjab State Industrial Development Corporation. The plant is being put up near Chandigarh. This will be the first project of its kind in northern India. The agreement to promote this project to be implemented in a new company called Max On India Ltd was signed by Mr. J. N. L. Srivastava, the Managing Director, PSIDC and Bhai Nanjit Singh, Managing Director, Max India Ltd.

The project is based on imported plant and machinery from the world renowned Bruckner Maschinenbau of West Germany. This will be first leading supplier of BOPP film in northern India. The project will give direct employment to around 250 people besides auxiliary units.

Max India has paid higher dividend of 18 per cent (15 per cent) in 1987-88. It is a pioneer in the manufacture of high-tech import substitution drug intermediates, 6-APA and 7-ADCA used in the manufacture of life saving antibiotics. It manufactures 6-APA under technical know-how from Toyo Jozo Co. Ltd of Japan and 7-ADCA in technical collaboration with Finchimica S.R.L. of Italy.

The company has its own R and D which is recognised by Department of Science and Technology.

The new company Max On India Ltd. has already made considerable progress in implementing BOPP project. It has got clearance for the capital goods imports and has acquired land. The new project is expected to go on stream by the third quarter of 1989.

As against the expected demand of 14,000 tonnes of BOPP by 1990 there is installed capa-

city of 4300 tonnes in favour of four of four units in the country. In view of the big gap in supply and demand the project is expected to operate at 98 per cent capacity from the first year of the operation.

It is expected to achieve a turnover of Rs. 25 crores in the first year of working and return of 25 per cent (after tax) on the capital employed.

HINDUSTAN CIBA

Hindustan Ciba-Geigy, which did well during 1987 and stepped up equity dividend from 18 cent for 1986 to 20 per cent for 1987, has shown all-round improvement during the year. The dyes division is exploring the possibility of diversifying into related fields which could considerably widen its range of products and lead to a substantial growth in turnover over the next few years.

The consumer products division has planned to introduce in the near future, high-quality photo-products for professional use. The plastics division has received a licence for the manufacture of hardeners for EPN resins. These will be manufactured at the existing EPN plant and will help boost the sales of resin.

The major thrust in the pharmaceutical division's strategy for immediate future would be to achieve planned volume growth through increased productivity, obtaining optimal prices for controlled products and streamlined operations.

Mr. M. N. Karani, chairman, has pointed out that for the chemicals industry, the task that lies ahead is enormous, but in every aspect worthwhile. The future will demand only products and

processes that are environmentally compatible. The company has intensified its efforts in this direction and is working towards a comprehensive waste-disposal strategy.

SURGIPLAST TIE-UP WITH FRG FIRM

Surgiplast Ltd. has embarked upon the new Rs. 3.06-crore venture in technical collaboration with Pharmaplan GmbH of West Germany, to manufacture disposable syringes.

Pharmaplan GmbH is an affiliate of Fresenius Group which is the world leader in surgical disposables, kidney care and other immunity care products.

The group already has operations or affiliations in Brazil, Canada, Greece, Indonesia, Kenya, Korea, Pakistan, Portugal, Singapore, Saudi Arabia, the U.S., W. Germany and Yugoslavia. Incidentally, Surgiplast is the Fresenius Group's first tie-up in India through Pharmaplan.

Currently, it is estimated that more than 2000 million injection shots are administered in India every year. The same number can be safely assumed as the market for disposable syringes, says a Surgiplast press release.

The Indian market for surgical disposables has been expanding very fast. A logical sequel to Surgiplast's disposable syringe plant would be a disposable needle plant. Both Pharmaplan and Surgiplast have agreed to pursue the disposable needle project, adds the press release.

BINDAL AGRO CHEM PLANS MASSIVE DIVERSIFICATION

Bindal Agro Chem Ltd. has embarked upon a massive diversification programme by entering into the field of plastics raw ma-

materials such as low density polyethylene (LDPE) based on molasses, an agricultural waste.

The company has taken over LDPE plant of IEL Ltd., Calcutta. This plant with a licensed capacity of 15,000 mt per annum is being shifted from Rishra (near Calcutta) to be set up in the Uttar Pradesh where the raw material is available in plenty. This plant after complete modernisation will manufacture LDPE from molasses, said Mr. Abhey Oswal, in New Delhi.

Mr. Oswal said that this plant will be commissioned by 1989 and at its full capacity utilisation, sales turnover from this plant alone will be to the tune of Rs. 45 crores.

The entry of the company in this field will open further avenues in petro-chemical industry. The turnover of the company for the current year 1988-89 is expected to be over Rs. 100 crores as in the first three months of the current year the company has achieved a sales turnover of Rs. 20 crores.

Its operating income increased to Rs. 55.29 crores (Rs. 3.18 crores) and profit before interest, depreciation and tax has moved up to Rs. 7.02 crores from Rs. 80 lakhs. After payment of interest of Rs. 1.39 crores (Rs. 11.83 lakhs), depreciation claims Rs. 52.28 lakh (Rs. 5 lakhs) and taxation Rs. 80.40 lakhs (nil), net profit comes to Rs. 4.30 crores (Rs. 2.58 lakhs). The shareholders reserve moved up to Rs. 6.95 crores at the close of the year (Rs. 1.96 crores).

DIAMINES AND CHEM. LTD.

Diamines and Chemicals Ltd., after meeting all stringent specifications of the foreign buyers, have been successful in procuring bulk export orders for their ethylene amines particularly for diethylenetriamine (DETA). Consequent upon this, DACL's first consignment, of 19 M.T. of DETA had left the Indian port on February 19, 1988 for the Netherlands. The subsequent consignment of 40 M.T. of DETA has also been shipped to Barcelona, Spain in March 1988 and further consignment of 40 M.T. of DETA

has also left for shipment to Belgium.

Within a period of two months, DACL has been successful in exporting about 100 M.T. of DETA worth about Rs. 35 lakhs and have already made a breakthrough by exporting substantial quantity of DETA for the first time from India after meeting the indigenous requirements.

PFIZER PROFITS DOWN

The Bombay-based Pfizer Limited, has reported a marginally lower net profit at Rs. 32 lakh for 1987 as against Rs. 34 lakh in 1986 due mainly to increase in costs of inputs with virtually no increase in the selling price of its products.

In view of the inadequate profit, the company proposes to declare a dividend at the rate of Re one per equity share for the year ended November 30, 1987 by transferring an equivalent amount from its general reserve.

According to the annual report for the year ended November 30

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1987, to be ratified at the annual general meeting at Bombay on May 17, the market performance of the company's range of pharmaceutical products from Bombay, Chandigarh and Kalyani has been satisfactory. These include terramycin, protinex, becosules, corex, nebasulf and deltacortril, ombantrin.

Pfizer exports touched Rs. 67 crores in 1987 from Rs. 63 lakhs in 1986, majority of them (60 per cent) to hard currency area.

It conducts business in more than 140 countries and is the fifth largest pharmaceutical company.

Mr. S. V. Pillai, its present managing director, will retire on August 2 to make way for Mr. C. Jensen, currently president of the company and formerly regional manager for Pfizer operations in the northern Africa region.

HIND. ANTIBIOTICS

The state-owned Hindustan Antibiotics Ltd. (HAL) achieved

32 per cent rise in turnover in 1987-88, with sales rising from Rs. 53 crores in 1986-87 to Rs. 70 crores.

It registered a growth of 33 per cent with value of production going up from Rs. 54 crores last year to Rs. 72 crores. Production of penicillin rose from 217 million mega units to 264 million mega units and streptomycin production was 113 tonnes against 89 tonnes last year.

During the year, the company restarted the gentamycin plant and achieved 37 per cent of targeted production. HAL also achieved a 63 per cent rise in the production of 6-APA, an intermediate required for the production of ampicillin, using its own enzyme technology. Production of formulations was worth Rs. 51 crores against Rs. 41 crores in the previous year.

Furthermore, the company expanded penicillin production capacity to 300 million mega units per annum. It also implemented its own technology for extraction of streptomycin which resulted in substantial cost reduction, ac-

cording to a press release issued by the company.

INDU NISSAN OXO CHEM

Indu Nissan Oxo Chemical Industries Ltd. of the Bhuva Group has shown remarkable performance for the year ended December 31, 1987. It has been able to maintain sales and other income of Rs. 2627 lakhs up to the introduction of two new products. This has resulted in the widening up the range of Oxo Alcohols to cater to the specific needs of the industry for superior products. The initial introduction of new products having been done to the satisfaction of various customers, the company has now started receiving bulk orders from the main consumers for the new products.

The profit of the company went up to Rs. 344 lakhs. The company has repaid term loans and interest to the financial institutions and banks to the extent of Rs. 400 lakhs.

In the annual general meeting of the company, Mr. D. C. Lami, Chairman of the company, said that taking into account the gro-

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with and profitability, the potential demand for the company's products has entered into a crucial stage with the taking up of the expansion-cum-modernisation of the existing plant at Baroda, to double its capacity from 12,500 to 25,000 mt per annum of Oxo Alcohols at an estimated outlay of Rs. 20 crores.

The necessary industrial licence has been received. The necessary finance for meeting the cost of the project is being tied up. Collaboration arrangements are completed and the company has finalised the detailed engineering services contract.

The company is also in the process of obtaining approval from the financial institutions.

According to the Chairman, the turnover is expected to go up to Rs. 70 crores from Rs. 25

crores. Civil and other works for the project were expected to start in the middle of 1988. To part-finance this project, a right issue of equity shares shall be made shortly, he disclosed.

KOTHARI SUGAR TO DIVERSIFY

Kothari Sugars Limited, is putting up Rs. five-crore plant at Manali near Madras for the manufacture of polybutene the main raw materials for making special grades of lubricants and various compounds that go into the production of electrical items.

The company is teaming up with a US-based company for the supply of know-how for the diversification project. The US company will provide the process licence and basic engineering package for manufacture of

polybutenes. Steps are being taken to tie up finances for project.

The Union government already permitted the Marathwada Refineries Limited to supply raw material. MRL and Kothari Sugars will soon be signing an agreement for the purpose.

The company has also received letters of intent for the manufacture of hydrogen peroxide and nitro-aromatics. Negotiations are underway with process licencees abroad for obtaining latest effective technologies.

PENTASIA CHEMICALS

Pentasia Chemicals has achieved a turnover of Rs. 122.80 crore during the year ended December 1987. The company's pentanetriol plant went into commercial production with effect from October 1, 1987.

The company has earned operating profit before interest and depreciation of Rs. 20 lakhs. After interest (Rs. 4 lakhs) and depreciation on a rata basis (Rs. 63.86 lakhs) there is a net loss of Rs. 9 lakhs. The directors have not declared any dividend.

The final cost of the pentanetriol project rose to Rs. 20 crores from the revised estimate of Rs. 19.75 crores. The company has obtained Rs. 80 crore from its promoters, Tamil Nadu Industrial Development Corporation Ltd. and Asian Paints (India) Ltd. and the balance of Rs. 12 lakhs is to be raised from financial institutions.

Production during the year has been below capacity on account of shortage of methanol and coal.

The company hopes to reach the rated capacity for pentanetriol (technical) before the

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the current year. The company's products have found acceptance with paint manufacturers and others. The sale of by-product sodium formate is assured. Pentasia Chemicals, which went into commercial production on October 1, 1987, has earned an operating profit of Rs. 5.63 lakhs during the first three months' operations ended December 1987. It has achieved a turnover of Rs. 122.80 lakhs during this period.

After interest charges of Rs. 7.16 lakhs and depreciation on a pro-rata basis of Rs. 63.86 lakhs, there is however a net loss of Rs. 10.39 lakhs.

SYNTHETICS AND CHEMICALS

Synthetics and Chemicals, the leading producer of synthetic rubber (SBR), has produced about 29,849 tonnes of SBR during the year ended March 1988 against 23,979 tonnes in the previous year. The sales were higher at 31,826 tonnes against 23,413 tonnes.

During the year, the customers obtained adequate supplies of SBR from the company. The tyre industry was supplied its full requirements of about 12,000 tonnes. For the benefit of the non-tyre sector and the small consumers, the company set up additional distribution points in places like Jalandhar, Kanpur, Bhiwandi, Faridabad, Kottayam, Hyderabad, etc.

According to Mr. Suresh T. Kilchand, Managing Director, the company plans to produce 37,000 tonnes during the current year and as such would be able to satisfy the growing need of the Indian rubber consuming industries.

POLYOLEFINS IND.

Polyolefins Industries Ltd. (PIL) has fared well in the first quarter of the current year with the overall sales being Rs. 39.47 crores against Rs. 34 crores during the same period last year.

Addressing the shareholders of the company at the annual general meeting in Bombay, the chairman, Mr. Arvind N. Mafatlal, said the sales of high density polyethylene have gone up to 9,000 tonnes during the first quarter 1988 as against 8,000 tonnes during the same period last week.

With the prevailing international prices 25 to 30 per cent higher than the domestic prices, the demand for HDPE is likely to increase and the company ho-

pes to fare even better in sales, he said.

Total production for the first quarter was put at 11,203 tonnes an increase of 2.9 per cent over the previous year.

The company's ethylene vinyl acetate copolymers project is likely to be on stream by the end of the year. The plant and machinery has been acquired and the project work is in progress.

The company has received the government approval for its chlorinated polyethylene project. The final clearance from the environment board is however awaited.

The company has put up an application for a project to manufacture polyacetal. The government approval is awaited. The investment on this project is likely to be Rs. 50 crores.



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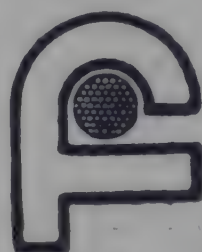
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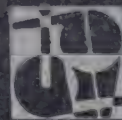
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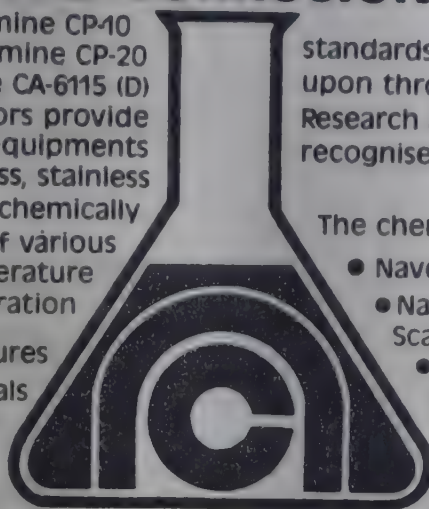
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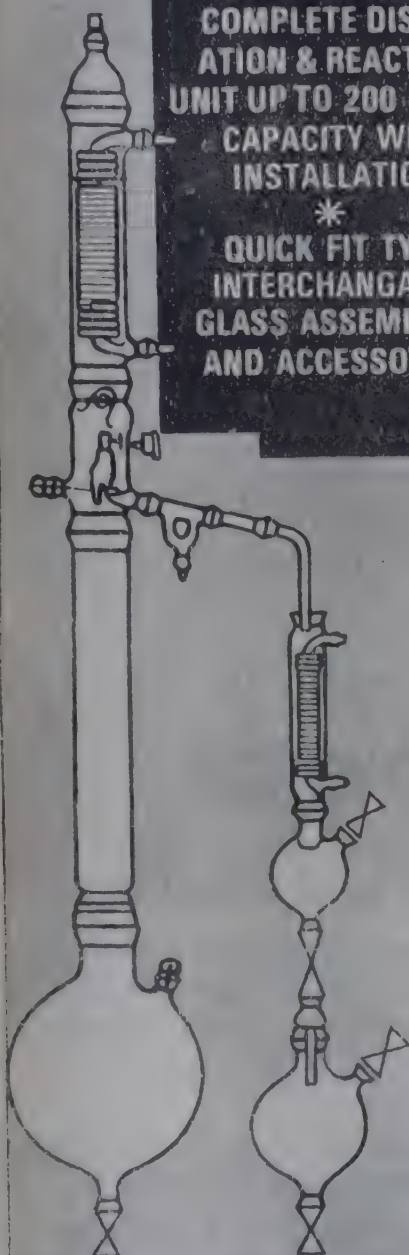
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Highlights in Chemical Technology (Part 2)

ALUMINIUM TITANATE SINTERED BODIES PRODUCED ON AN INDUSTRIAL SCALE IN JAPAN

Meiko Ceramic Co (Gifu Prefecture, Japan) recently succeeded in producing on an industrial scale aluminium titanate sintered bodies (special Ceramics SSR) by means of special raw material modifications. It has been said that aluminium titanate sintered bodies are hardly manufactured on an industrial scale. The company has started manufacturing the product on a full industrial scale. (*Japan Chem. Wk.*, 1/7/88, p. 2)

CONTINUOUS PROCESS UNVEILED FOR FLUORINATED AROMATICS IN ITALY

Eur Chem Sintesa, the fine chemicals subsidiary of Italy's Eni Chemicals (Milan, Italy), is now operating a 1,000 tonnes/year unit at Tressino to produce fluorinated aromatics. According to Enichem, the process offers a substantial cost saving over batch processes because it uses a continuous diazotization step in the production cycle. Diazotization is the reaction of a primary aromatic amine with nitrous acid in the presence of excess mineral acid to produce a diazo compound.

Sources at Enichem's two European competitors — Rhone Poulenc and Riedel de Haen (W. Germany) — confirm that Enichem material is on the market but they do not accept Enichem's claim that the process is cheaper. Competitors fear that the fluoraromatic field is getting crowded. Mallinckrodt (St. Louis) is

building a 1,000 tonnes/year plant that will be the first in U.S.A. It, too will use a continuous process. (*Chem. Wk.*, Jan. 6/13/1988, p. 22)

THE WORLD'S FIRST CONTINUOUS BULK- POLYSTYRENE- POLYMERIZATION PROCESS GETS A TRIAL DEBUT IN JAPAN

World's first continuous bulk-polystyrene polymerization process got a trial last July, 1987 in a \$18.3 million, 30,000 tonnes/year polystyrene plant at Yokkaichi by the route's developer, Dainippon Ink Chemicals (Tokyo). The company has not divulged process details, as the new route is going to be patented but reports that it uses compact equipment (reducing space requirements by two-thirds), and requires simpler control of temperature and pressure.

The unit will make general purpose goods with molecular weights up to 350,000. Combined with the low monomer content of the polystyrene, this will improve impact strengths of industrial parts made with the plastic, reports Dainippon. (*Chem. Eng.*, 2/15/88, p. 17)

SOLAR CELLS CAPABLE OF WORKING DAY & NIGHT DEVELOPED

Solar cells that work day and night are being developed by Stuart Licht, a Weizmann Fellow in the chemistry department at Massachusetts Institute of Technology (Cambridge). The laboratory scale photoelectrochemical cells use a light absorbing electrode of Cadmium selenide telluride and a counter electrode of cobalt sulfide immersed in an aque-

ous polymefide solution to convert sunlight into electricity at an efficiency of 12.7%. A part of the unit's output is then sent to a storage device, where the ions — from a tin sulfide electrode dipped in alkaline sulfide solution — are converted into tin metal. At night the process reverses and power is delivered by converting the tin into tin ions. Overall system efficiency is 11.3%.

Licht notes that photo-electrochemical cells are more proficient than photovoltaic units because they can produce chemicals and fuels in addition to power. (*Chem. Eng.*, 2/15/88, p. 21)

BRITISH-SWEDISH INTEGRATED GASIFICATION COMBINED CYCLE TECHNOLOGY IS COMPETITIVE WITH NATURAL GAS IN POWER SCHEME

A British/Swedish integrated gasification combined cycle technology developed by Humphrey & Glasgow (London) and Nycomb AB (Stockholm) is reported to compete with natural gas in power scheme. When the above two companies announced their Clean Power Generation (CPG) concept in 1987, they made some dramatic claims. Environmentally, a CPG power station could perform as well as a natural gas fired one, yet burn any type of coal in standard equipment already available in the market and deliver high thermal efficiency. Now the two companies are seeking to prove their claims with a demonstration project.

CPG uses the Integrated Coal Gasification Combined Cycle (IGCC) — i.e. coal gasification and

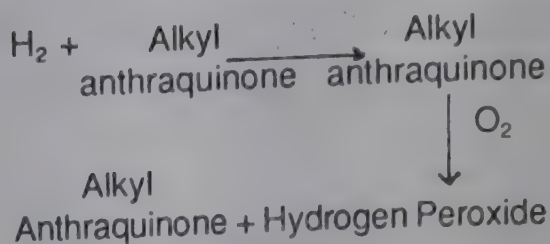
gas clean up, followed by power generation in gas turbine/alternators, and by steam generation to obtain additional power from steam turbine/alternators. The technology is already one hundred percent commercially proven reports Humphrey & Glasgow (H & G).

So far H & G and Nycomb have targeted 11 countries where CPG could fit in. These are countries where there is a need for a clean power alternative to nuclear energy, and cheap natural gas is not readily available. These include such nations as Sweden, the Netherlands, Italy, Denmark, W. Germany and Spain, as well as China, Japan and Australia. Sweden seems a prime initial target.

The Swedish State Power Board announced last November, that it is studying coal-fired, clean burning 300-600 MW demonstration plant. The Power Board has not yet selected a technology or supplier, it has talked about an IGCC plant. Behind this talk, a pressurized fluidized bed demonstration plant is already being built by ASEA Brown Boveri in Stockholm and fluegas desulfurization is a well-proven technology that could be supplied by Sweden's Flakt. If the demonstration plant project is approved and the Power Board decides to follow the IGCC route, CPG could well be in the running for its first trial. (*Chem. Eng.*, 11/23/87, p. 180); (*Chem. Eng.*, 2/15/88, pp. 35-36)

A NEW COMPACT PEROXIDE PROCESS IN THE HORIZON

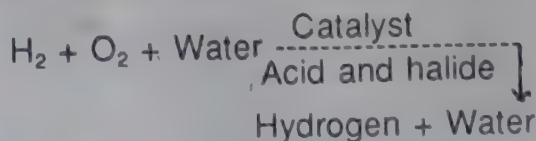
The conventional hydrogen peroxide process is the anthraquinone autoxidation process which has been in existence for over 30 years. This process involves the following steps and uses several reactors and numerous separations — all costly investments.



Recently Du Pont has unveiled a new compact and less capital intensive process based on direct combination of hydrogen and oxygen. The new route is a metal-catalyzed reaction of hydrogen and oxygen in an acidic, aqueous medium in the presence of a platinum-group metal and a halide ion. The process depends on a new catalyst that boosts yields and permits the production of peroxide at higher concentrations.

The Du Pont method is outlined in U.S. patent 4,681,751. The patent cites a method that uses a palladium catalyst on an adsorbent carbon support and that employs no organic component in excess of 2% by weight of the aqueous reaction medium. The presence of HCl in the solution accounts for the high concentration of peroxide. Concentrations higher than 13% are regularly achieved. In one example, the concentration of 25.2% was recorded.

Although precise temperature depends on the type and concentration or reaction ingredients, temperature below -10 Degree C are contemplated. Preferred pressures for H₂ O₂ formation range from 500 to 2500 psi. The higher the pressure, the higher the peroxide concentration.



OUTLINE OF DU PONT'S NEW ROUTE TO HYDROGEN PEROXIDE

The new method eliminates a

number of the reactors and the vent required in the autoxidation method. Secondary reactions in method require regeneration of solvent and catalyst and removal of organic material from the extra hydrogen peroxide.

Great cost savings could be achieved with the new system, the system has same potential benefits. The savings may be nullified by increased risks, to notably chance of explosion, when hydrogen and oxygen are combined directly. Du Pont's reputation for safety is well-known, therefore, it must have developed the requisite safety for their future planning of the process.

The plant using the new process could be built to serve a market as small as 15-20 million lb/year. In contrast, world-scale plant, using autoxidation process must be at about 80 million lb/year. The company expects to have its demonstration facility in operation either in 1988 or 1989. The company does not expect the new route to replace current plants based on anthraquinone autoxidation process. The new process, however, will significantly reduce construction cost and savings for new plants.

Several other companies besides Du Pont are in the race to develop an alternative route to hydrogen peroxide:

- (a) Air Products and Chemicals have patented a direct method and licensed it to several companies, which have pilot plants.
- (b) H.D. Tech (Woodbridge, Ontario), a joint venture of Chemical and Huron Technologies, developed an electrolytic route that has been tested in a paper mill in Canada. The company now is seeking to build site plants of 5-20 tons/day.

c) Both Phillips Petroleum's Provesta Subsidiary (Bartlesville, Okla) and American Biogenetics (Irvine, Calif) have talked of using an enzyme catalyzed reaction to make hydrogen peroxide from methanol and oxygen. Phillips now sells an enzyme called alcohol oxidase and is trying to develop the know-how.

Some of these new routes could lead to the construction of smaller plants much nearer the markets they serve, such as pulp and paper mills and waste treatment plants. (*Chem. Wk.*, 1/27/88, pp. 36-37).

TOHO RAYON (JAPAN) SURVEYS WORLD MARKET FOR CARBON FIBRES

Carbon fibres have in recent years become an essential raw material for aircraft and space craft industries in advanced countries. Their use in sports goods, cameras, OA-equipments etc. are progressively developing in Japan and other forward-looking countries. As yet, developing countries have no use for this useful fibre except perhaps in defence and sport goods sector. The world market for carbon fibre is predicted to reach 6,000 tonnes in 1990 with an average growth of 12% per annum till 1990, according to a recent survey conducted by Toho Rayon Co of Japan, together with its two foreign partners Enka AG of West Germany and Celion Carbon Fibre of U.S.A.

While the demand in Taiwan and South Korea is expected to remain somewhat dull, steady growth is predicted in U.S.A., Europe and Japan. In particular, the U.S. market is expected to grow to 3,000 tonnes by 1990, accounting for almost half of the world demand predicted for the same year.

The above three companies esti-

Table-1
World Carbon Fibre Demand Estimate (in tonnes)

Region	1987	1988	1989	1990
USA	2,000	2,200	2,600	3,000
Europe	700	800	900	1,000
Japan	850	900	1,000	1,150
Others	750	750	800	850
Total	4,300	4,650	5,300	6,000

mate that the world carbon fibre market in 1987 reached 4,300 tonnes, a 19% rise over the preceding year. On the basis of this figure, demand for the following three years is predicted as follows:

Year	Demand in Tonnes
1988	4,650
1989	5,300
1990	6,000

This indicates that the world demand will expand by 40% from 1987 to 1990, during which the U.S. market will grow by as much as 50%. This larger growth (50%) as against 40% reflects the expected active demand for use in aircraft and space-craft industries. At present these industries consume almost 80% of the U.S. consumption of carbon-fibre.

The Taiwan and South Korean markets which showed an increase in 1987 over the preceding year for use in sport goods are likely to level off in 1988 and record a slight rise of 850 tonnes in 1990. The increase from 1987 to 1990 is expected to be only 13% because no new outlets are on the horizon.

The demand in Europe is predicted to grow from 700 tonnes in 1987 to 1000 tonnes in 1990. The major uses are for the aircraft and space industries followed by sports goods and other industries. Aircraft and space vehicles will be the main outlets but other uses will develop steadily. It is foreseen that the Japanese market will grow from 850 tonnes in 1987 to 1,150 tonnes in

1990, showing a 35% rise during the three year period. Interestingly, in Japan in contrast to U.S.A. and Western Europe, sport and leisure goods will continue to be the main outlets, but industrial uses, are bound to increase steadily, although the absolute amount involved will be limited.

Industrial uses' in Japan covers the use of carbon fibres for OA equipment, and cameras etc. The chopped fibre is used as a reinforcing material for nylon, polycarbonate and polyphenylene sulfide etc.

India's market for carbon fibre is so insignificant that it is not even mentioned in the survey. World carbon fibre demand estimate from 1987 to 1990 is depicted in Table-1 above.

WORLD'S FASTEST PROCESSING SYSTEM FOR X-RAY FILMS PIONEERED BY KONIKA CORP.

Konika Corp. (Japan) has developed the "Konika Medical Super-Rapid System" — the world's fastest processing system for X-ray films. It is capable of processing the films in only 45 seconds, exactly half the time needed for conventional systems. It will be marketed in 1988 spring. In a bid to facilitate rapid processing of the films, the company has improved "Sakura Hi-Otho" type monodisperse emulsion technology and pioneered an exclusive use processing chemical. In addition, it has also improved a roller and a drying box, both of which are for

an automatic developer. It is claimed that the new system is designed to process X-ray films at high speed without any deterioration in the picture quality concerned. It is suitable for emergency radiography for blood vessels, digestive tracts and surgical operation.

Along with progress in medical treatment, there is growing need for speeding up processing of X-ray films. An ordinary processing system for X-ray film calls for 90 seconds processing and a rapid processing system has not been developed in the last 20 years. Usually the film quality deteriorates when the X-ray film is processed at higher speed. The new system was unveiled at the meeting of the U.S. Radiation Society. (*Japan Chem. Wk.*, 12/31/87)

COOPERATIVE RESEARCH — KEY TO TECHNOLOGY ADVANCES

At the recent conference "R & D Technology 1988 Key Issues For Management" many leading authorities from reputed American companies such as Monsanto, WR Grace & others emphasized the role of cooperative research and acquisition of foreign ideas for rapid progress in technology.

Today's research managers must recognize that their job is to provide technology — not just invent it. The search for technology that the company cannot invent must be present and on going. This search cannot be simply a sporadic desperate crisis reaction upon discovering that a competitor has stolen the march. Indeed, a company — whether through licensing, collaborative research or joint ventures — must continuously assure itself of the knowledge at the frontier of its scientific or engineering endeavours. In short, a dynamic company should have an organized search function incorporated in its management.

S. Allen Heininger, Monsanto's corporate Vice-President cited Japan as an example. Japan's competitive strength does not arise because the researchers are more creative than American researchers. Neither does Japan invent more in basic science than the U.S.A. In fact, in almost all areas of technology, the Japanese sought out and imitated other nation's technology — and then practiced it more effectively in world commerce. The Japanese have been quick to realise that the key to acquiring vital external technology is cooperative research. Today Japanese industries are fan-

ning around the world for collaboration in research with American and European companies. This is particularly evident in the field of biotechnology, where Japanese industries have finalized collaborative R & agreements with American and European biotech companies in a big way.

Among American companies, WR Grace is a firm believer in collaborative research both within the U.S. and outside. Grace has recognized early that the key to acquiring vital external technology is cooperative research. Over 20% of Grace's \$1 billion research and development budget is committed to such research and that percentage is highly likely to grow. Moreover, nearly half of Grace's research staff of 200 scientists is active to some degree in cooperative research. Grace has about 25 research contracts with Universities.

The company has their programmes with federal laboratories. It has half a dozen cooperative research agreements with several American companies. In addition, the company has another half dozen cooperative research agreements with large companies, most of them foreign. (*Chem. Wk.*, 3/9/88, p. 1)

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Choice of Lining in Chemical Industries

Dr.S.K. SHARMA*, Mr. R.RAJESH**, Mr. N.R. RAMANATHAN***

INTRODUCTION

Lining forms a vital aspect in any Chemical Process equipment, therefore, it becomes critical to decide which type of lining is to be used for the prevailing condition. In-depth knowledge is necessary on the various linings that are being used presently.

The basic points which are to be reviewed for the selection of a lining are indicated below:

1. Spot the objective of lining; whether it is repair, protection etc.
2. Analyze the environmental conditions viz heat, moisture, impact, abrasion, atmospheric corrosion, chemical corrosion, sparking and fire potential etc.
3. Critically suggest necessary surface preparation of the substrate, viz the cleaning methods to be followed which are sand blasting, epoxy painting etc.
4. Examine the method of application and make it to give the expected results in specification of lining thickness, surface finish etc.
5. An optimal quality control procedure that is to be followed should be established.

TYPES OF LINING

The prevailing linings are Rubber, Lead, Glass, Silicon-Iron, Acid Proofbrick, PVC, Fibre glass reinforced plastic, Silica lining, Concrete lining and Porcelain lining.

Now, of these above mentioned linings, most of the chemical process industries largely use the following three types:

1. Lead
2. Fibreglass reinforced plastics (FRP)
3. Rubber

Lead Lining

Of the various metals used in lining, it was found that only lead was both anti-corrosive and temperature resistant. Therefore, it was used in lining of various process equipment until Rubber & FRP came into the picture.

The lead lining was successful in various conditions but its main disadvantages were that they peeled off after a period of time and a patchwork in such places was quite an impossible task. Its costwise comparison proved to be on the higher side as compared to that of FRP and Rubber. The other disadvantage was its inflexibility compared to Rubber and FRP. Thus lead lining is on a decreasing trend.

The main advantages of Rubber and FRP are that they are corrosion free, to an extent temperature resistant and they permit patch work in any kind of condition. The flexibility of these help us to mould it to any desired shape or size. Moreover, FRP has higher strength to weight ratio, higher impact resistance, better electrical (i.e. insulation) properties, higher degree of light transmission and also economic manufacture, low capital and labour costs.

Because of these advantages of Rubber and FRP, we confine our presentation to these in this manuscript.

Fibre Glass Reinforced Plastic(1)

The starting material for FRP is fibre glass mats, resins, accelerators and catalysts. Three kinds of mats are usually used. One unwoven crushed straw mat in the form of layers finds its application for packing and providing thickness.

The other two forms are woven, in which one can be used where extra strength is required and has a strength 8 times more than the unwoven crushed straw mat. The third one is used for extra fine finishing.

The resins, catalysts and accelerator give hardness to the fibre glass mats. The resins used are Isothalic Polyester petroleum bases or styrenes. The catalyst used is methyl ethyl penetene and the accelerator is Cobalt naphthalate. They are mixed in a proper ratio such that the mixture hardens in 1/2 an hour.

*Professor and Incharge, BITS (Pilani) Practice School at GRASIM Industries Limited.

**M.Sc (Tech) Engineering Technology Student of BITS Practice School at GRASIM Industries Limited.

***B.E. (Hons) Chemical Engineering Student of BITS Practice School at GRASIM Industries Limited.

Resin and catalyst required are mixed in one drum; then accelerator is added in small quantities. The reaction starts as soon as the accelerator is added.

To start with, a mould is needed on which the layers of these mats are pasted with mixture of resins, catalyst and accelerator till the required thickness is achieved. It is now allowed to stay for 1/2 an hour, in which it becomes hard and is separated from the mould and is baked in an oven at a temperature of 60°C for 2 to 3 hours and the desired product is ready.

The pipes of FRP are light and can withstand a load of 16 tons. FRP is also coated over PVC pipes where both strength and protection from corrosion are required. FRP coating can be done over mildsteel after blasting it with tiny iron filings to give rough surface for the resins to stick.

The only disadvantage of FRP is that it shrinks a lot and tends to bend. To prevent this, the mould are made in such a way that they keep it stretched.

APPLICATION OF FRP

FRP has a wide range of application due to its greater mechanical strength and the ability to be moulded without heat or pressure(2).

The various fields in which FRP has found applications are:

1. Building and Construction

In this area FRP is used in a wide range. It is used in roof light-sheets, internal partitions, cladding, sectional buildings bathroom units, tanks, pipes, window frames etc.

2. Boat Hulls

It is used in boat hulls due to the property of corrosion and weathering resistance. It is used in life boats, dinghies, fast motor boats and larger sail boats.

3. Rail Transport

It is used in the manufacture of endwall sections of diesel rail cars and locomotives, doors, ducts, rectifier trays, floors, corridor, ceiling panels, tank wagons etc.

4. Road Transport

In this field it is used for car body design, moulding

insulated ice cream vans, insulated containers etc

5. Aerospace Applications

It is used in making the radomes, dielectric paneling, secondary structures and furnishings.

6. Chemical Plant

The introduction of FRP has changed the face of chemical industry due to its moulding ability, flexibility, corrosion resistance and mainly due to its economic aspect.

It is being used in pipelines, and process equipment where corrosive liquid are used. FRP is also widely used in oil industries. It is also used for pollution control equipment viz ductings, exhaust fans, volutes etc.

USE OF FRP IN RAYON INDUSTRY(3)

A. Regeneration of Viscose Fibre

Ripened viscose reacts with the acid to give cellulose filament and the other products of the reaction being Na_2SO_4 and H_2O . The filament is further processed to its end use. The machines used in such process, for spinning machines made of FRP can also be put to successful use.

B. Acid Regeneration

In acid regeneration, pipelines can be of FRP in view of the composition of spin bath. As highly concentrated acid is used and the temperature conditions are rather high using of FRP is not feasible. In such situation rubber lining is recommended.

The process where the temperature is below 60°C stage evaporation, the use of FRP is rather significant and subsequently rubber lining is preferred because of temperature condition.

In filtration process where the composition of the filtrate is 140 gpl H_2SO_4 , 250 gpl Na_2SO_4 , and 168 gpl ZnSO_4 and heat through the media of steam, rubber lining is critical.

OTHER APPLICATIONS OF FRP

A. Demineralisation

Soluble mineral impurities present in the water are removed by cation and anion exchangers and mixed

for high pressure boilers. This is done by demineralisation of hard water by removing scale forming substances such as salts (carbonates, sulphates, chlorides, etc.) of Mg, Ca and Na. The storage tanks like H_2SO_4 , HNO_3 and anion exchanger tanks and NaOH tanks and pipelines in such unit operation, the use of FRP should be desired.

HCl Storage

HCl, a by-product of caustic soda plant can also be stored in tanks with FRP or rubber lining depending on its concentrations.

Stirrer Tanks

In the stirrer tanks which are found in the acid regeneration, viscose manufacture unit, FRP lining can be used in these tanks as highly corrosive liquids are stored.

Accessories

The various accessories such as pipe joints, impeller housing, impeller blades, pumps stainers, etc are moulded out of FRP. They find a vast application in various departments of Rayon Industry.

Rubber Lining

Rubber lining is yet another versatile compound that is being used for lining in chemical industry.

The rubber lining in chemical industry is done by the following types of rubber depending on the conditions.

Methodology adopted for rubber lining is described below:

1. CLEANING THE SUBSTRATE

The first step in the process of lining rubber is cleaning of the base. This is done to mainly remove, rust, oil or grease and other offensive materials. This can be done by:

A. Mechanical Cleaning Methods (Blasting Techniques)

By sending in a blast of non metallic or metallic abrasive under pressure on the base surface the cleaning process can be completed. This is successful in removing the rust and giving required surface finish for the following steps.

B. Chemical Cleaning Methods

The removal of metal oxide and other chemical impurities can be achieved by means of treatment with dilute acids and other chemicals.

2. APPLICATION OF BONDING MEDIUM

After the required surface finish is obtained, the adhesive layer which acts as the bonding medium is applied uniformly over the substrate. Some common bonding agents are Ty-Ply, Thixon, Chemlok etc.

3. RUBBER SHEETING

Over the bonding medium the rubber sheet of the required thickness is pasted.

Type of Rubber	Application and Condition
i. Natural Rubber	
a. Hard	For vessels which are maintained under vacuum. They can withstand high temperature and pressure.
b. Soft	For vessels above 80°C, but not suitable for vessels under vacuum. They form a good substitute for FRP.
ii. Neoprene Rubber	For vessels which store liquids at high temperature and dilute acid.
iii. Nitrile Rubber	For storage of oil and other fatty and oily liquids and can withstand temperature upto about 130°C.
iv. Butyl Rubber	
v. Polypropylene Rubber	Finds its application in storing highly corrosive liquids like pure acids.

4. STITCHING

This step is done to remove any air gaps that exist between the layer of rubber sheet and the base substrate.

5. SPARK TESTING

This is done to check the presence of cut in the rubber sheeting that has been laid, which can result in seepage of the liquid at a later stage and hence defeat the possibility of a good lining. For this, high voltage supply of 5 Kv is supplied per square mm of the surface and the conductivity is noted.

6. VULCANIZATION

Vulcanization involves the crosslinking of chain polymer with the atoms of elements such as sulphur. This transforms the soft weak plastic like material to a strong, elastic product making the rubber to lose its tackiness, makes it insoluble in solvents and more resistant to deterioration by heat, light, chemicals.

The various vulcanization systems are:

Sulphur vulcanization — uses 1-3% (pre-mixed) in the rubber compound.

Sulphurless vulcanization — uses thiuram disulphate compound, or selenium and tellurium.

Peroxide vulcanization — for saturated rubbers we use peroxide.

Autoclave Conditions

Pressure of Steam	- 40 lb/in ²
Temperature	- 100-110° Celcius
Time required	- 3-4 hours.

Rubber lining is used in chemical industry in place where FRP is unsuccessful. Rubber being more cohesive and temperature resistant has a wider range of application compared to FRP. It is used for autoclave, high pressure boiler linings too. The only limitation is that unlike FRP it can never be used for moulding vessels or other accessories. It can be used only as a lining to any vessel. The costwise comparison shows that rubber is on the higher side compared to FRP. Therefore, it is used in place where FRP is totally unsuccessful.

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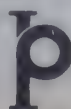
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Chemical News From Abroad

SEES PROFITS SURGE OUGH BLACKSPOTS MAIN

In 1987 ICI enjoyed a "crack-
good year by almost any
rdstick", according to chair-
n Denys Henderson. Sales
d profits rose for almost all of
e UK major's business sectors,
abling ICI to post record pre-
t profit of £1.31bn (\$2.32bn)
turnover of £11.12bn. Total
arnings were up 29 per cent
1986, while sales volumes
mbled 11 per cent and sales
ue increased 10 per cent.
e blackspots continue to be
res, where profits slid 23 per
nt, and fertilizers which are
all in the red.

Reviewing the year, Hender-
n said ICI had seen "a lot of
citing momentum" which had
t been stemmed by the Octo-
r stock market crash. The
urth quarter was also strong,
said, and though pre-tax pro-
was down £5m from the third
arter at £308m, it was £20m
on the year-earlier period.
In the US, the chairman said,
I had got out of heavy chemi-
ls manufacture, thus remov-
g its exposure to cyclical do-
turn. The acquisition of
auffer for its agrochemicals
usiness had been 'even better'
an ICI had expected, Hender-
n added, and Stauffer's speci-
ity and base chemicals busi-
esses had both been resold be-
re the stock market crash.
ere are some small business-
acquired with Stauffer that
main to be sold.

The company also boosted its
eds portfolio with the acquisi-
on of Milnmaster and Societe
uropeenne de Semences, but
ad declined to buy the UK

Plant Breeding Institute because
"it was too pricey", Henderson
continued. ICI Australia had
abandoned its pursuit of the ac-
quisition of the pharmaceutical
group Faulding because it was
"also too expensive", and the
group is not going to pay "silly
prices" for any acquisitions in
the future, the chairman said.

For the future, Henderson
added, ICI would seek to "beef
up" its business in the Asia Pa-
cific region, particularly in Ja-
pan. The region accounts for 22
per cent of world chemicals sal-
es but only 5 per cent of ICI's
turnover. Overall, the chair-
man said, "ICI is well placed to
withstand any economic down-
turn which may or may not hap-
pen".

In the group's consumer and
speciality products businesses,
profit rose 13 per cent to £574
m on sales up 18 per cent at
£4.33bn. Pharmaceuticals earn-
ings rose 6 per cent to £306m
despite high marketing and de-
velopment costs for new drugs
to be launched this year and in
the future. Sales climbed 5.5
per cent to £1.1bn.

Paints sales and earnings,
driven by strong demand in
Europe and the US, rose dra-
matically. Turnover jumped 65
per cent to £1.29bn and profit
almost doubled to £92m.

ICI's other effect products al-
so enjoyed gains with sales up
5 per cent at £1.94bn but the
UK group says that high devel-
opment costs in new business-
es limited profit growth to a mo-
dest 1 per cent at £176m.

In the industrial products sec-
tor, profit climbed 30 per cent
to £595m on turnover up 4.6 per
cent at £5.17bn. Particularly
strong performances were re-

corded in the UK, Europe and
Australia. General chemicals
and petrochemicals enjoyed
strong demand and, ICI says,
margins were bolstered by tight
supply and a stronger Deutsch-
mark. General chemicals sales
rose 8 per cent to £1.88bn and
earnings increased 25 per cent
to £208m. Petrochemical turn-
over dropped by 2 per cent to
£2.76bn, but profit leapt 43 per
cent to £310m. Industrial ex-
plosives sales rose 3 per cent
to £339m while earnings ad-
vanced 46 per cent to £38m.

Fibres continued to be hit by
strong competition and despite
ICI's positioning in the higher
performance end of the market,
profit declined 23 per cent to
£41m on sales of £668m.

Overall, ICI's agriculture bu-
siness improved considerably
with sales rising 5 per cent to
£1.74bn and earnings climbing
from just £7m in 1986 to £48m.
Agrochemicals and plant breed-
ing sales increased 19 per cent
to £901m with profit up 85 per
cent at £52m. Fertilizers re-
mained in the doldrums despite
cost cutting measures. But los-
ses of £4m marked a major im-
provement from a £21m deficit
in 1986. Sales rose 6 per cent
to £858m.

ICI's research and develop-
ment spending was around
£460m, equivalent to 4-4.5 per
cent of turnover. R & D direc-
tor Charles Reece said 55 per
cent of this was devoted to bio-
logical sciences and 30 per cent
to materials. Some 10-15 per
cent of total R & D is spent on
process research, especially in
heavy chemicals.

AKZO SALT BUY

Akzo of the Netherlands has
won US government approval
for its \$65m takeover of Dia-

mond Crystal's salt operations. The deal was announced last July.

Diamond Crystal has plants at St. Clair, Michigan, Akron, Ohio and near the Great Salt Lake in Utah. Sales are \$100m/year and the plants employ 1,000 people. Akzo will integrate the plants with its US subsidiary International Salt Co.

The deal, which takes Akzo's salt capacity to around 15m ton/year, confirms it as the world's largest salt producer.

BOC FINDS BUYERS FOR GRAPHITE UNITS

BOC has found new buyers for its US carbon graphite businesses following a drawn out investigation of the original sale to Horsehead Industries by the justice department. The new deals, for which letters of intent have been signed, total \$240m which equals the book value of businesses.

The Ridgeville graphite electrode facility is being bought by Japanese chemicals concern Showa Denka, subject to anti-trust investigation. Two other electrode facilities in Pennsylvania and New York, as well as a needle coke plant in Texas and the calcium carbide business in Kentucky are going to a leverage buyout consortium. This deal is subject to shareholder approval as one of the managing directors, Jim Baldwin, will have a financial interest in, and be the part time chairman of the new company.

BOC decided several years ago that carbon graphite was not a business it wanted to persist with. It regards this deal as better than the Horsehead proposal which did not include

the needle coke and calcium carbide businesses.

SPAIN MULLS ONE FERTILIZER FIRM

Spain's Government is considering creating a single national fertilizer company through the merger of state-owned Enfersa and the fertilizer assets of ERT and Cros.

Meeting on March 1, the commission overseeing the Spanish fertilizer sector's restructuring plan agreed to create a committee to outline proposals for a new co. The committee will deliver its preliminary report on March 20. The move follows the failure of ERT and Cros to agree to a merger of their fertilizer assets. The creation of a new, more competitive company is more urgent after a disastrous year in 1987 for Spanish producers. Overall sales rose but the share of the total market taken by imports rose to 22 per cent.

DOWNSTREAM INTEGRATION TAKES ARCO INTO BDO MARKET

Arco Chemical is forging ahead with its strategy to focus on downstream integration and the development of new value added products and markets. It has announced plans to enter the butanediol (BDO) market and has also detailed a number of developments on the technology front.

The US firm is to build a 34,000 ton/year plant for the production of 1, 4-butanediol using technology based on the hydroformylation of propylene oxide. Arco is one of the world's leading producers of propylene oxide and, during the period 1986-1990, is carrying out ex-

pansion plans to lift its worldwide capacity by a third to around 1.4m ton.

The plant, to be built in Texas, is due on stream in the first half of 1990. Details have yet to be finalized but it is known that the BDO facility will use technology licensed from Kuraray Co., a Japanese chemicals and fibres concern based in Osaka. Butanediol is used as a chemical intermediate with applications in engineering resins, elastomers and solvents.

Separately, Arco Chemical says it is at an advanced stage of development of new technology to produce methyl methacrylate and superabsorbent fibres using isobutylene. The technology is cleaner and more cost-effective than production via acetone cyanohydrin, a company spokesman said, and Arco is currently "reviewing the options" for commercialization of the process.

The company also has other products in the pipeline. Arco is working on the development of a non-calorific fat substitute based on propylene oxide and a series of high molecular weight polystyrene resins based on a patented process technology. Both are described as being at a preliminary stage.

These new developments may help bolster Arco's plans for future growth. President and CEO Harold Sorgenti, recently said that the company's earnings performance in 1988 looks strong, commenting: "If today's price and exchange rates hold, we expect first quarter earnings to increase by at least 50 per cent over the \$59m recorded in the same period last year".

New business areas are expected to take an increased share of Arco's research and

development spending. In 1986, total R & D costs stood at around 100m with 15 per cent going on new business. This rose to 25 per cent in 1987, where first half R & D spending (the latest available figure) was \$14m, and is set to climb to 33 per cent this year.

DUTCH TAX PLANTS HIT PROJECTS

General Electric Plastics may consider plans to build its mass roots bisphenol-A and polycarbonates plants at Beren op Zoom in the Netherlands after the Dutch government's decision recently to abolish a major investment incentive scheme known as WIR.

Other chemical companies including DSM and Dow Chemical also indicate they might re-examine their investment plans if the scheme is not replaced by some alternative form of financing.

The unexpected move prompted GEP to say it may review investment plans for the Netherlands amounting to some Dfl. 1.7bn (\$90m). Chairman and chief executive Paul Dawson said the company would look at other sites for the plants it had previously evaluated in Ireland and Spain. "We have no idea what the government will come up with to offset the loss," he commented.

GEP has completed the engineering work on its bisphenol A plant but has not yet broken ground on the project, so relocation is certainly feasible if the Dutch government fails to come up with an acceptable alternative to WIR.

DSM, which benefits to the tune of around Dfl. 100m from WIR, said the scheme played a positive role in the company's investment decisions and its abolition increased the appeal of West Germany and Belgium for investors.

Dow Chemical said the move would have an adverse affect on foreign companies looking to invest in the Netherlands.

Under WIR, companies could get grants worth 12.5 per cent of investments in fixed assets. It is believed that new measures replacing WIR will be directed at boosting employment.

ICI BIDS FOR CIL

ICI is seeking to strengthen its North American operations by taking full control of its 72 per cent-owned Canadian affiliate CIL. The UK chemicals giant has offered Can \$38/share (\$30) to shareholders. There are some 3.9m shares still outstanding valuing the bid at around Can \$148m.

The move is in line with ICI's corporate philosophy which favours having complete control of subsidiary companies. It could also be a preliminary step towards a major streamlining of the Canadian business which has been hard hit by the depressed state of the world fertiliser market.

UCB ACQUIRES SPANISH UNITS

UCB, the Belgian chemicals, drugs and films producer, has spent some of the BF 2.67bn (\$75.4m) it set by earlier this

year for acquisitions, with three purchases in Spain.

In the pharmaceutical sector, it has gained a 95 per cent shareholding in Laboratories Roger, which manufactures prescription specialities including cardiovascular drugs. Roger posted a turnover of Pta 964m (\$8.5m) in 1987. The acquisition, UCB comments, will give the company greater penetration in the Spanish drugs sector. Its other concern, Laboratories UCB, markets different speciality pharmaceuticals, including brain activators. It is about to launch an anti-allergic product.

In the chemicals sector, UCB has upped its stake in Quimica Iberica from 75 to 100 per cent and taken a 60 per cent shareholding in Aragon Quimica. Quimica Iberica manufactures and sells resins, including acrylic, polyurethane and radiation curing, for home and export markets. Aragon Quimica produces and sells a speciality choline chloride used mainly in vegetable feed. Technology developed by Aragon Quimica is expected to benefit UCB's own choline chloride process. The acquisition also opens up the Spanish market for UCB.

EXXON BROADENS BASE

Exxon Chemical is moving into the water based acrylates business with the acquisition of Sochima SpA.

Based in Italy, Sochima, has sales in excess of \$15m/year. It has a plant near Turin mainly manufacturing water based acrylates for the adhesives market. The company claims a major share of the Italian market.

Chemical Markets Abroad

US, EUROPEAN CLOSURES FIRM STYRENE MARKETS

Tightness in the European and US styrene markets will continue at least until the end of the third quarter this year, producers believe, with continued demand for feedstocks from Far East derivative units removing spot material from Rotterdam and a series of routine plant turnarounds planned on both sides of the Atlantic expected to shorten supply.

With little spot product available, since before Christmas, prices for T1 and T2 have climbed steadily from \$1,240-1,260/ton cif in early January to \$1,575-1,590/ton for T1 and \$1,280-1,310/ton fob to \$1,585-1,600/ton for T2. However, with current global demand exceeding supply, T1 and T2 prices have practically merged and traders welcome any product they can lay their hands on.

Some producers including BASF, Huls and Dow are in the spot market buying material for their Far Eastern polystyrene plants, although Dow claims its European purchases are for its global system and not necessarily destined for any particular region. BASF has been looking for material for its swap deal with Mitsubishi. Under the arrangement, BASF buys European styrene for Mitsubishi's PS contracts while the latter supplies Hyosung — BASF's PS units at Ulsan in South Korea.

BASF's current problem is the lack of T2 availability, although it has just secured 3,000 ton of product at \$1,600/ton fob Rotterdam from three traders. This mini-surge of activity has provided the only real

spot business in Europe recently.

Huls, meanwhile which is expected to take control of non-integrated PS producer Svenska at the end of April is reported to be, trying hard to find sufficient feedstock for the 600,000 ton/year plant. The company said it was looking for Eastern Bloc product but sources claim that it might have to close Svenska's 30,000 ton/year unit which was brought on stream in January. Around 1,000 ton of Soviet product was in Rotterdam a few weeks ago and some 9,000 ton is still expected although supplies are somewhat erratic.

March contract prices in the US have remained at February's level of 42 cents/pound (\$925/ton equivalent) led by Sterling and followed by Arco. Although this level is considerably lower than the current European contract which is expected to rise to DM 2,500/ton in Q2, there is no spot available for trading and sources say that in a balanced market, there is no immediate reason for stinging the customer.

In the next few months however, all this is set to change. Plant closures and an anticipated increase in PS and ABS demand in the Far East and Europe — the former in the Far East is already growing more than 10 per cent/year — should conspire to force up spot and contract price ideas.

Amoco, which has been dogged with problems at its 335,000 ton/year Texas City plant since last autumn has decided to close the unit for four weeks

and Dow's 700,000 ton/year Freeport facility is due for catalyst change and minor modifications at the end of May which will also take it out of stream for four weeks.

Europe is also set to come under increasing supply pressure. Atochem has a routine closure in the middle of Q2 although Montedipe's 50,000 ton/year unit at Mantua in Italy is now back on stream after a month's turnaround. Huls is expected to close between July and September, thereby exacerbating its supply crisis with Svenska. Dow at Terneuzen also has a closure at this time. Minor bottlenecks during turnarounds is inevitable, sources say, although at most it is unlikely to increase styrene capacity by 1-2 per cent. So with only an estimated 350,000 ton extra capacity expected in Europe over the next two years, producers are not expecting much change in the underlying supply problem which has beset the market recently.

US CURBS PHOSPHATE OUTPUT

Demand for US phosphate rock in the domestic market last year was again curtailed by government acreage reduction programmes which cut consumption of phosphate fertilisers.

According to the US Bureau of mines, export demand for phosphate fertilisers and cereals was not significant for US producers although shipments were maintained by competing at lower prices. Subsidised farm income in the US amounted to some \$30bn and government subsidies supplied about one third of farmers' income.

7. The bureau estimates that in 1988 domestic production of phosphate rock will be 1m ton, 35m ton of which will be consumed in the US.

The bureau's annual figures indicate that most of the US and world phosphate rock reserves are widely distributed in marine deposits. Identified, but far unmined resources, as well as undiscovered reserves are estimated to contain some 100bn ton. Areas such as Middle-East North and West Africa have reserves several times larger than those known. Other areas such as continental shelves and sea mounts also have mineral deposits.

SPANISH FERTILISER IMPORTS CLIMB

Spain's fertiliser industry had a disastrous year in 1987 according to figures released by Orefersa, the managing corporation set up to oversee the national fertiliser reshuffling plan. Imports rose by 45 per cent to 1.3m ton taking nearly a quarter of domestic demand.

Last year the Spanish fertiliser sector had an overall turnover of Pta 130 bn (\$1.15bn), against a planned figure of Pta 165bn. Sales from the companies involved in the reshuffle, Orefersa, ERT and Cros, reached Pta 100bn, 76 per cent of the projected sum.

Actual productivity, measured as an annual sales figure for each employee, was also lower than forecast at Pta 15m instead of Pta 21m. This was caused partly by poor operating levels. Plants in all fertiliser sectors were run well below nameplate capacity. Complex fertiliser plants were run-

ning at 65 per cent, nitrogen plants at 80 per cent and superphosphate plants at 55 per cent.

It is worth noting however that domestic demand in 1987 already exceeded estimates for 1990. These were 1m ton nitrogen, 500,000 ton phosphate and 340,000 ton potash.

* Following an agreement to allow Cros to control seats on the two groups may soon sign a ERT's board, it is expected that deal to merge their fertilizers assets into an existing joint venture, Fosforico Espanol after considerable delay.

PO MARKETS REMAIN STEADY AS ARCO EXPANDS CAPACITY

Europe's propylene oxide (PO) market is still sailing on an even keel. Demand is growing slowly and with adequate supply, buyers have been enjoying a period of sustained price stability keeping contract business in the range DM 2 300-2,500/ton.

The PO business has undergone some major changes over the past few years and has seen the emergence of Arco and Dow as dominant suppliers in Europe and sole suppliers in the US. In the US all other PO producers have fallen by the wayside and although there are a number of players remaining in Europe, all have forward integration into PO derivatives and most are net buyers of PO.

Arco has been increasing its dominance in the European market recently. Last year it upped capacity at Botlek in the Netherlands by 15,000 ton to

245,000 ton and is poised to bring a new GTBA/PO unit on stream at Fos-sur-Mer in France, effectively replacing an old Atochem plant. The Fos unit will add 150,000 ton of PO capacity and pushes Arco into number one in the PO supply stakes, the company claims. Elsewhere, it has increased capacity by 60,000 ton at Bayport and Channelview, Texas, and is investigating further expansion.

Atochem, the last of the non-forward integrate producers pulled the plug on its PO operations last year with the closure of its 65,000 ton/year unit at Lavera in France. However, even before its closure, the units' entire output was marketed in Europe by Arco. No PO has been produced in the UK since 1983 when ICI shut its 80,000ton/year unit at Wilton.

Consumption of PO in Western Europe is now close to 1m ton/year and the Fos commissioning will bring total capacity to around 1.3m ton. At the moment, Europe is still a net importer of PO, but this is only due to Arco bringing material from its US units pending the start up of Fos.

Despite the increase in PO supply during Q2 when the unit is commissioned, observers are not expecting any major fluctuations in price levels. PO price levels are largely independent of feedstock or supply changes because suppliers are so limited but producers say prices are generally set at a level buyers can stand.

Demand growth in PO remains sluggish and is expected

to increase around 2-3 per cent this year. Within the end-use sectors, best performance is expected for propylene glycol ethers which have been tipped to increase by 5 per cent, mainly due to substitution for ethylene glycol ethers in solvent and coating applications.

However, this sector accounts for only around 7 per cent of PO production. The major use is still in polyols used in the manufacture of polyurethane which takes around 65 per cent of output, and growth in this sector is expected to be more subdued. Around 25 per cent of PO output goes directly into propylene glycol manufacture leaving the balance of 3 per cent for other uses including surfactants.

Sources say the long term picture for PO is still one of price stability, although producers seem determined to see contract levels closer to the DM 2,500/ton mark. With the recent softening in propylene levels, margins remain good leaving little argument for short term price hikes, but tightening in propylene supply expected later this year, along with increased demand for PP production could provide the producers with a firm platform to push for increases.

VAN OMMEREN BUYS US FIRM

Van Ommersen Ceteco, the Rotterdam-based transport, storage and trading group has acquired the US speciality chemical distributor Seegott Inc. for an undisclosed figure.

Seegott, which has sales of around \$25m, distributes spe-

cialities in the mid-west and eastern US and represents around 30 producers including Du Pont, Goodyear and General Electric. It employs around 50 people at its headquarters at Solon, Ohio and in offices in New Jersey and Baltimore.

The move continues Van Ommersen Ceteco's penetration of the US market and diversification from its troubled tanker operations. That process began in 1986 when the Dutch group bought Californian distributor ET Horn. Spokesman Feidus Fokma said that Seegott and ET Horn complemented each other but there are no plans to merge the two.

Further expansion could involve international growth within the two companies, said Fokma, but he did not rule out further acquisitions. He said the company would be consolidating its shipping interests and looking for greater global coverage in the tank/storage business.

Van Ommersen's merger with the Amsterdam trading house Ceteco last December marked the company's first step into trading, another area in which it is anxious to expand. The company is now looking to acquire traders in the US and Far East.

NAPHTHALENE MARKET STILL IN DECLINE

Western Europe's naphthalene industry is still in decline, according to a study by Chem Systems. Regional oversupply, driven by the increasing use of orthoxylene instead of naphthalene in phthalic anhydride pro-

duction, has caused severe price erosion.

But the worst of the slump may be over, according to Chem Systems' Charles Mikulka. Countering this downward trend is the development of low volume, non traditional markets including concrete superplasticizers, carbonless paper solvents and ethylene-naphthalene polymers, and renewed export demand from China.

However, with falling demand in high volume markets, Chem Systems expects the West European market to decline from 159,000 ton in 1985 to 141,000 ton by 1990. Operating capacity is currently 60 per cent and recently stocks had built up to 27,000 ton, resulting in the burning of crude product for its fuel value.

The situation is markedly different in Japan and the US, however, where operating rates are higher and the market is growing. In Japan, capacity utilisation is close to 100 per cent and the country will become a net importer before the end of the decade, though this could provide export opportunities for European producers.

In addition, the quality of naphthalene in high value derivative manufacture is becoming increasingly important, prompting companies to install naphthalene capacity.

NAPHTHALENE CONSUMPTION (000 TON)

	1985	1990
W. Europe	159	141
Japan	181	200
US	117	124

Source: Chem Systems

In the European Market

Naphtha prices continue to dip on the back of weaker crude but have steadied to \$137-140/ton cif NWE.

Ethylene prices have firmed a little with improved buyer interest and a lack of prompt spot material. Availability is confined to the Med and prices are now talked in the range \$400-410/ton cif NWE for April/May delivery. One 4,000 ton parcel was bought by a UK major at \$400/ton cif NWE. With producers having taken extra material from the ARG pipeline to cover for spring shutdowns, availability has become tight and spot deliveries are now commanding DM 850/ton.

The **propylene** business is still relatively weak and price ideas are hovering in the range DM 530-550/ton cif NWE. Availability of chemical grade material in the Med is still good with one deal heard on a 1,500 ton lot at DM 530/ton cif NWE, but polymer cargoes are increasingly hard to come by. With little sign of spot business picking up in Q2, early contract

negotiations are rumoured to be kicking off in the range DM 580-600/ton.

The **butadiene** market now appears to have hit rock bottom with no demand for spot material and producers maximising crude C₄ and butadiene cracking in a bid to curb surpluses. Price ranges are becoming more difficult to pin down in such an inactive market, but traders put notional prices at \$230-250/ton fob or lower, reflecting plummeting levels in the US gulf where spot ideas have dropped under 15 cents/pound.

After frenzied activity in the run up to the EPL, the aromatics market has now come off the boil.

Benzene has dropped back to \$340-350/ton with more prompt product available although numbers up to \$360/ton are still being talked. \$345/ton was done twice and provided the only real business of the week.

There has been little activity in the **toluene** market and although chemical industry demand remains strong, weaker gasoline prices have lowered market levels to \$250-260/ton.

Interest in **xylenes** and **ortho-xylene** has weakened following the gasoline trend, but prices have held steady at least week's levels.

Mixed reaction among **para-xylene** players this week has left spot numbers around \$630-640/ton. With little product available it is difficult to assess the exact range of the market but it is clear that levels of \$650/ton being talked in Brussels have not emerged. One trader sold 500 ton to the Eastern Bloc through the Baltic at \$650 ton/cif but there were also unconfirmed rumours of \$615/ton fob Rotterdam being done.

Styrene has remained static with \$1,600/ton now taken as the benchmark for further deals.

Methanol prices have moved up a little on the back of strong chemical demand to DM 300-310/ton fob. However, prices are still low in world terms and imports have been diverted to more lucrative spot markets in the Med and the Far East. Soviet materials are still on offer in NWE but Rumanian supplies have now dried up.

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Environment

LONE ICI SAYS HCFC 22 IS UNSAFE FOR AEROSOLS

ICI stands alone in its recent decision to withhold the supply of HCFC 22 for use as a propellant in personal care aerosols on toxicological grounds. In a recent meeting, major chlorofluorocarbon (CFC) producers including Du Pont, Hoechst and ISC Chemicals disagreed with ICI over the toxic safety margins on which the company has based its decision. In an effort to resolve the difference of opinion over an adequate safety margin, producers have identified areas where more information is required. The companies will reconvene in a couple of months.

It is hoped that HCFC 22 will prove a suitable alternative to CFC 11 and 12 used as aerosol propellants, as it is 20 times less damaging to the ozone layer. It is currently being considered by an international industry task force under the auspices of Ecetox.

The information used by ICI dates back to 1975, when laboratory tests showed that pregnant rats exposed to 50,000 ppm of HCFC 22 produced a statistically significant number of deformed offspring. Rats subjected to 100 ppm and 1000 ppm of HCFC 22 showed no significant effects. It is estimated that humans using aerosols containing HCFC 22 are exposed to 200 ppm of the propellant. ICI's toxicologists use a safety margin of 1000 times the effect level, giving a figure of 200,000 ppm. A spokesman for the company admitted that ICI was taking a cautious view, but did not believe a risk should be taken.

The company's corporate toxicology laboratory reviewed the historical data whilst investigating the potential for using HCFC 22 as aerosol propellant. The substance is extensively used as an industrial refrigerant and also a raw material for PTFE. ICI's decision does not affect these applications.

Other products being investigated by the company in a \$100m/year (\$180m) drive include dimethyl ether, methyl chloride and fluorocarbons 142b and 152a.

Meanwhile the European commission has been asked to ban the use of CFCs as aerosol propellants by the European parliament's environment committee. A similar proposal has been made by the West German, Belgian and Dutch aerosols industry association.

* Akzo has bought back its former dimethyl ether (DME) product group from Douwe Egeberts. The Dutch chemical producer plans to strengthen its position in the field. Use of DME as an aerosol propellant looks set to rise as consumption of CFC 11 and 12 declines. Akzo proposes to build a 25,000 ton/year DME plant at Rotterdam, starting up in 1990. Meanwhile DME will be procured from other sources.

HYDRO ADVISES ON NITROGEN USE

Field trials carried out by Hydro Fertilisers in East Anglia, UK, indicate that if nitrogen is applied to wheat in spring at a rate which maximizes yield, leaching through the soil into water aquifers is minimal.

Nitrates present in the top metre of soil were measured at harvest after trial crops had been grown. Soils untreated with nitrogen contained 44 kg/hectare of nitrates from natural sources. Soils treated with the optimum rate of nitrogen — for the most profitable yield — produced no significant increase in the quantity of nitrates in the soil and wheat yields increased by 60 per cent. When the optimum rate of nitrogen was exceeded, the level of soil nitrates at harvest increased markedly. Nitrogen applied at rates 60 per cent in excess of the crop's needs, resulted in 85 kg/hectare of nitrates in the soil.

According to the UK fertilizer manufacturers association (FMA), a halving of the application of nitrogen on winter crops over the past ten years is already having an effect in some regions.

However, soil scientists at the UK government's Agricultural development advisory service claim that excessive rates of nitrogen are still being applied unnecessarily.

In July, the European commission will enforce its 50ppm ceiling on nitrates in the water supply. The FMA believes the UK is unlikely to meet this level. For the short term, the association says UK water authorities need several hundred million pounds to upgrade treatment facilities, but adds that it is important that the agricultural industry takes a long term view.

Friends of the Earth, the environmental group believes a tax should be levied on sales of nitrate fertilizers, in accordance with the 'polluter pays' principle. It also says the govern-

ment should enforce the 1974 control of pollution act more rigorously, by creating water protection zones which would allow water authorities to control farming practices. A spokesperson said both actions were logical solutions to the nitrates problem, adding that the same ideas are being mulled by others, including the government and the national farmers union.

CHEMICALS TO COST GERMAN WATERWORKS

DM 2 bn

The association of German water and gas resources has complained that a major portion of the waterworks' total capital budget, some DM2bn (\$1.2bn) annually, will be required over the next few years to upgrade drinking water treatment facilities, because of chemical pollution of water wells.

The association says that hazardous substances, in particular nitrates and halogenated hydrocarbons, led to the closure of several hundred wells between 1980 and 1985. Since 1965, the association claims, investment in new treatment facilities to remove contaminants, has increased sixfold. Even so, some chemicals such as organic and inorganic fertilizers and pesticides cannot be completely removed.

Waterworks operators have criticised federal and state governments for their laxity in enforcing antipollution regulations; and at the same time called on the chemical industry to devote more attention to the toxicological aspects of its products.

DUTCH FIRM PROPOSES ARTIFICIAL ISLAND

It is estimated that as a result of the recent North Sea conference, companies and public authorities will have to find alternative dumping sites for some 400m ton/year of chemical and other wastes.

The Dutch dredging company Boskalis Westminster has sent the Dutch and Belgian waterways and environment authorities a plan for an artificial island located at the mouth of the Westerschelde. The island could become a deposit site for waste, including chemicals. Boskalis claims that the plan is economically feasible as the direct building cost of Dfl. 1bn (\$529m) will be partially met by fees from dock facilities for damag-

ed ships, and energy plants which could also be located on the island.

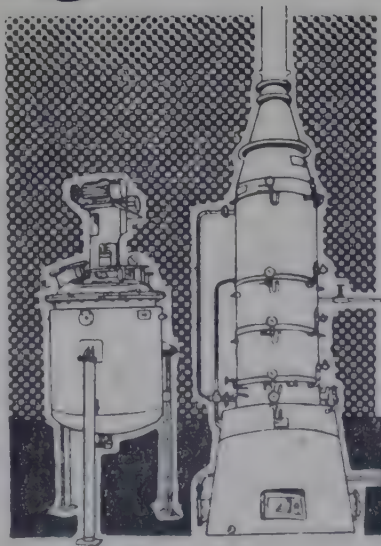
REGULATIONS EXTENDED

Bundesrat, the upper house of West Germany's parliament has passed new regulations on the reporting of industrial accidents involving hazardous substances. The new regulations will affect 5,000 chemical plants, a big jump from the 800 covered by existing legislation.

The provisions, which come into effect this spring, call for all plants working with 325 listed hazardous substances to conduct safety analyses.

Facilities producing crop protectants and fertilizers or working with genetically engineered microorganisms will be subject to the regulations for the first time, as will chemical storage facilities.

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Biotechnology

ANALYST PREDICTS BIOTECH SHAKEOUT THIS YEAR

Biotechnology companies will be the targets for acquisition by the end of the year. But acquiring firms will not be attracted to taking over cheap companies, argues Stuart Weisbrod of Prudential-Bache Securities, because were that the case, many firms would have been taken out after the market crashed last October and stock prices were in many cases close to cash per share.

Weisbrod and his colleagues have devised a formula for calculating the most likely candidates for acquisition. Such firms would be worth more as divisions of major health care firms than as stand alone entities, they still have the rights to significant potential products or have attractive proprietary technologies.

Centocor is rated by Weisbrod as one of the most likely candidates for takeover. Centocor's products are proprietary and it has not entered into licensing agreements with larger companies. Weisbrod predicts that the takeout price for Centocor would be in the \$ 49 per share ballpark.

Nevertheless, some firms will still be attractive even if they have licensed away many of their products. Biogen, although it licensed away many of its initial products, has excellent proprietary research programmes on Aids and anti-inflammatory products. Biogen, Weisbrod contends, is probably worth more as part of a major health firm than as a stand alone company.

Cetus, although its number one product Interleukin-2 has been affected by a patent infringement suit, is an attractive candidate thanks to its strong research base. It is the most diversified, fully integrated biotech company, with strong genetic engineering and monoclonal antibody research, especially for cancer therapy, Weisbrod says.

Other firms that could be acquisition targets are Biotherapeutics and Imreg. Biotherapeutics is a publicly-owned health care service firm focusing on the development and application of advanced biotechnological approaches for the treatment of cancer. It could be an attractive target for a hospital management company.

Imreg, although engaged in the development of proprietary modulators of the immune system for therapeutic and diagnostic use, is seen as a one product company. The drug, **Imreg-1**, is a promising potential treatment for Aids but it is believed that Imreg is not integrated enough to bring the product to market. If clinical studies prove successful **Imreg-1**, could become a blockbuster in corporate hands.

Companies that may possibly be targets for acquisition include Amgen, Ecogen, Collaborative Research and Integrated Genetics, according to Weisbrod. Amgen, Ecogen and Collaborative Research have developed one or more important products in joint ventures with a single large company.

Amgen has sold partial rights to a number of products to Johnson & Johnson and Ecogen has done the same with Ameri-

can Cyanamid. Collaborative Research is developing prourokinase with Sandoz and in each of these three cases the larger partner is the most likely suitor for acquisition. Integrated Genetics on the other hand, has licensed away most of its initial products but could be an attractive buy because of its proprietary technology.

ABPI CALLS FOR GOVT. SUPPORT

ABPI, the association of the British pharmaceutical industry is urging the UK government to encourage investment in the sector by being more sympathetic to the industry's needs. Failure to do so will have a deleterious effect on investor confidence in pharmaceutical development and capital expenditure plans, an ABPI spokesman said.

The warning comes on the back of an announcement that drug imports into the UK last year leapt 16 per cent to \$786m (\$1.4bn) while exports rose 6 per cent to a record \$1.62bn. The pharmaceutical industry provides Britain with its second-largest manufacturing trade surplus after transport equipment.

In spite of the dramatic fall in the dollar, sales to dollar-linked markets still managed to rise by 2 per cent. Sales to Western Europe rose 11 per cent and those to Japan by 43 per cent.

Drug companies are worried, however, that the UK government may be about to go back on a commitment to repeal the licence of right law. The repeal bill is currently at the report stage in the House of Lords (the UK parliament's upper law-making body).

Companies will only invest in the UK if the political climate

is seen to be sympathetic to industry's needs. If the government fails to honour its commitment it will be viewed as a breach of faith the spokesman added. ABPI is also urging the government to spend more money on academic research to complement the \$700m the industry spends on developmental research.

\$40M BULK DRUG UNIT

Bristol-Myers has unveiled plans to build a \$40m bulk pharmaceutical production facility in Barceloneta, Puerto Rico. To be located adjacent to the firm's existing units, construction will start in the second quarter of this year with start up scheduled for the first quarter of 1990.

Engineering design has been completed by the drug firm's industrial division but the identity of the contractor has not been revealed. The plant will make the antidepressant buspirone and the heart drug encainide. A third product sotalol, already approved in several markets, will also be manufactured in bulk quantities.

HSE GRANTS

The UK health and safety executive (HSE) has £6m (\$10.8m) available for outside contracts in its programme of research for 1988-89. The HSE has just published details of some 400 projects planned for the coming year and although \$12m of the total budget of \$18m is reserved for in-house work, about a third of the budget is allocated to outside contracts.

It is HSE policy to ensure that research receives at least 25 per cent of its budget and Dr. Steve Gentry, head of research laboratory division, says they are looking at ways of farming out many of their rou-

time testing responsibilities to commercial ventures.

NYCOMED INVESTS \$18M IN MOLECULAR BIOSYSTEMS

Nycomed, the medical imaging division of Norway's Hafs-lund, is paying Molecular Biosystems \$3m for exclusive European, African and Middle Eastern rights for **Albunex**, the contrast imaging agent for ultrasound. The Norwegian firm has already made an up front payment of \$2m with the remaining \$1m to be earmarked for funding phase 1 trials in the US.

Furthermore, Nycomed is investing \$5m in 300,000 Molecular Biosystems stock with an option to take a further 300,000 shares for \$6.4m. This would give the Norwegian firm about a 6 per cent stake in the US group, according to Dr. Ken Widder, Molecular Biosystem's chairman and ceo.

Molecular Biosystems is currently negotiating rights for the far eastern markets with other firms and intends to sell the product in the US itself. Widder estimates the maximum potential market for the imaging agent is \$400-500m in the US and \$200-300 in Western Europe.

Nycomed will support Molecular Biosystems' clinical efforts in the US and be responsible solely for European clinical trials. This deal with Nycomed is the perfect match owing to its experience in the imaging agent sector, explains Widder.

The Norwegian firm posted sales of about \$200m in 1987 and is Europe's leading contrast imaging agent maker ahead of Schering, Gerbert and Bracco. In the US Nycomed has licensed **Omipaque**, non ionic contrast agent, and other products to Sterling Drug. Widder expects

Albunex to be on the US market by mid-1990 and Europe by late 1990 or early 1991.

Nycomed posted sales of about \$200m last year. This total represents approximately one third of Halslund's sales.

BRISTOL-MYERS SIGNS RESEARCH DEAL

Bristol Myers has signed a \$8m cooperative research deal with Yale university to develop new anticancer drugs. This agreement is a renewal of a 1982 agreement between Bristol-Myers and Yale. Under the terms of the deal, the US drugs major will provide the Yale comprehensive cancer centre with \$600,000/year for the next five years for cancer chemotherapy research.

The US drugs firm has the option to licence anticancer drugs discovered by Yale over the next five years. Under the original agreement a number of promising compounds have been identified and patents have been applied for.

Areas of research under the deal include the development of anticancer antibiotics, studies on overcoming drug resistance of certain cancer cells, identification of drugs that can convert malignant cells to benign cells, synthesis of new anticancer and antiviral drugs and tests of promising new drugs on cancer patients.

Meanwhile, the national institute of health is planning to give Bristol-Myers exclusive marketing rights for Peptide T, a potential Aids drug. This drug is believed to work by preventing the virus entering the cell. Other companies wishing to object to the plan have about two months to appeal the decision. The company is already working on dideoxyadenosine and dideoxyinosine.

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News About New Projects

EXXON STUDIES ENTRY INTO EUROPEAN PP MARKET

Exxon chemical is studying entry into the fast-growing European polypropylene market.

Separately, the company has confirmed that it intends to undertake a major polyethylene expansion project at its Meerhout, Belgium, complex.

"As a major worldwide polymers supplier, we are always studying the possibility of extending our range of polymers, as well as expanding the geographical manufacturing capabilities of our current product range", said Bob Wilson, Exxon Chemical's vice president, polymers Europe.

"In polypropylene, incorporating recent capacity expansion announcements, Exxon Chemical will become the second

largest producer in the US in 1990. We are committed to maximizing the profitability of this investment and will continue to look worldwide for opportunities where our polypropylene can bring quality or performance advantages.

"This includes looking for opportunities in Europe where our products will provide customer benefits. Local sourcing options being studied to meet potential future needs include importing, tolling and new or shared capacity", Wilson said.

Originally based on the Exxon/Sumitomo process, Exxon's existing 318,000 ton/year PP plant at Baytown, Texas, has been modified to use the Himont/Mitsui Petrochemical catalyst. A major expansion of the plant will raise capacity to 454,000 ton/year, and make Exxon the second largest PP producer, after Himont, in the US by 1990.

The company currently imports limited volumes of polypropylene from the US into Europe for some special clean resin applications.

Most of Exxon's European propylene, which is produced at Notre - Dame-de - Gravenchon, France and at Fawley, UK, is used as feedstock for the company's higher olefins produced at the same sites. Some of the propylene is also used as feedstock for production of **Vistalon** ethylene-propylene rubber and **Paramins** additive; and the remainder is sold in the merchant market.

Although the company is quite open on ethylene capacity figures, it declined to divulge any details concerning its propylene supply/demand balance.

In polyethylene, Exxon has announced that it is to raise capacity of the 245,000 ton/year Meerhout, Belgium plant by 50 per cent. The increase is to come in three successive steps at a total cost of \$ 30m.

The first step, mainly involving process improvements, is already under way and will be completed by mid-1988, adding 20,000 ton/year of capacity.

The following steps will involve modification to the existing lines, increasing capacity of each by 50,000 ton/year and bringing the total capacity to 365,000 ton/year. The first line should be operational by the end of 1989 and the second during 1990.

The Meerhout expansion will give Exxon a worldwide polyethylene capacity of 1.5m ton/year, including 780,000 ton/year in Western Europe and Saudi Arabia, confirming its role as one of the world's leading suppliers.

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NEWS FROM JAPAN

Sankyo Speeds Up Drug Operations in U.S. and Europe

Sankyo Co. is energetically pushing ahead with its international drug operations in the U.S. and Europe. The company applied at the end of last year to U.S. authorities for production approval for "Cefmetazone" antibiotic. It granted in July, 1985 Upjohn (US) the right to develop and market the antibiotic in the U.S. The U.S. company has completed clinical tests for the product.

The antibiotic will be marketed in the U.S. two years hence if everything goes smoothly. It has already been put on the Spanish market.

In June 1985, the company also granted E. R. Squibb & Sons (US) the right to develop and market CS-514 antihyperlipemia everywhere in the world, with the exception of S. Korea, Taiwan and Thailand. The Japanese company is scheduled to apply this summer to U.S. authorities for production approval for the drug. It will take a similar step in Europe this year.

In February last year it granted Upjohn the exclusive sales rights for CS-807 oral-use cephem antibiotic. In addition, it recently granted Roussel Uclaf (France) the right to exclusively develop and market the antibiotic in Europe. The product has been put into phase-II clinical trials in the States and Sankyo will apply to U.S. authorities for production approval for the product itself three years hence. The product will be subjected to phase/II clinical trials in Europe several months hence.

Export sales account for only 3% of Sankyo's annual sales: major export items are agrochemicals and high-molecular stabilizers. The company, however, expects exports of new drugs to increase in the near future and aims at raising the export ratio for drugs to 10% as a first step and to 30% over the long term.

Japanese Trader Will Market Taiwanese Carbon Black

Okahata & Co., an Osaka-based trader, has concluded an agreement with China Synthetic Rubber Corporation, Taiwan's sole carbon-black maker, under which the Japanese firm will exclusively market the latter's products.

The interlocking interests in this business are the intention of advancing into the rubber-material field on the part of Okahata and that of expanding business abroad on the part of the Chinese firm. Okahata will sell the main carbon-black grades under the "SYNBLACK" brand for use in treads and carcasses, aiming at sales of 1,000 tons in the initial year and 10,000 tons in the third year. It is the first time that a Japanese firm and a Taiwanese firm have linked up on carbon black business.

China Synthetic Rubber is a business of a Taiwanese trust group having 16 affiliates and is operating a 50,000-t/y carbon-black plant using Continental (US's) technology with its export market extending to Thailand, Malaysia, Indonesia and the Philippines.

Polyolefin Makers Work Out Guidelines for Production Increase

Japan's polyolefin makers have reached agreement with regard to resumption of operation of idle plants and construction of new ones. Behind this is the fact that polyolefin operations — as well as those involving polyvinyl chloride, ethylene oxide, styrene, rigid vinyl-chloride pipes and electric wires/cables — were exempted from March, from application of the Temporary Measures Law for Structural Adjustment of Specific Industries.

Those planning to expand polyolefin production through resumption of idle plants and remodelling of existing ones are obliged to inform MITI of their plans 3 months before start-up of the plants concerned. All of them are allowed to freely scale up polyolefin production so long as they take the above steps.

Domestic ethylene producers have also been forced to carry out similar procedures. Ethylene business was exempted from application of the said specific law earlier than polyolefin operations.

Domestic polyolefin makers have worked out the guidelines because their rush into plant-and-equipment investment may result in excessive polyolefin supply just as was the case before the specific law was applied.

They will give notice — in the middle of this year at earliest — to MITI of their plans for resuming or building LDPE and L-LDPE plants since raw material ethylene is still in short supply and resumption of idle plants calls for huge funds.

Ammonia Plant Seen Being Mothballed : Nippon Steel Chem.

Nippon Steel Chemical Co. has announced that it will suspend operation of a 54,000-t/y ammonia plant at its Tobata factory at the end of March. The company will commission Mitsubishi Chemical Industries Ltd., and Mitsui Toatsu Chemicals, Inc. to produce a corresponding amount of the product. It will thereby continue to supply the product to existing users.

This move is intended to improve the efficiency of the company's ammonia operations with urea imports in the background.

There will be eight Japanese ammonia makers in Japan after the company has stopped operation of the plant. This illustrates the severe circumstances surrounding Japan's ammonia industry.

The industry has been forced to scale down production activity since the product has lost its in-

ternational competitiveness with regard to its application to fertilizer. Domestic producers have successively suspended or scrapped their production facilities.

Japan's ammonia production in fertilizer year 1986 ending last June reached 1,800,000 tons, of which only 210,000 tons were applied to fertilizer production. The combined production capacity in the same year stood at 2,090,000 tons a year and producers need to make further streamlining efforts.

Nippon Steel Chemical started producing ammonia in 1962 using hydrogen obtained from coke-oven gas, emitted from the Tobata iron-works belonging to Nippon Steel Corp. its parent company.

Chugai To Form Joint Venture In U.S. with Upjohn

Chugai Pharmaceutical Co. said it will establish with Upjohn Co. of the United States a joint venture company in Chicago ear-

ly in May to produce pharmaceuticals.

Chugai, one of Japan's largest pharmaceutical makers, said the joint company will be capitalized at \$1 million and owned 55% by it and 45% by Upjohn of Kalamazoo, Michigan.

The joint venture is aimed at expanding Chugai's business in the United States, it said. Its products will be sold through Upjohn's sales network, starting in some years time.

Sixty Companies Want To Take Part In Development Of Separation System

The Ministry of Agriculture, Forestry and Fisheries is scheduled to start a project for development of "a high separation system for food industries" during next fiscal year. Until now a few more than 60 companies have announced their desire to take part in this new project.

The new project aims at studying technology for producing new kinds of food in the future, in such ways as development of materials to constitute the foundation for functional food and effective use of micro-resources for food. Besides such food industries as flour milling, oil and fat, and brewing, manufacturers of measuring instruments, who are involved in research chromatography etc., and plant companies wish to participate.

The technology of separating and refining effective materials, which have physiologically active functions, has made considerable progress in the field of pharmaceutical production. This technology has already been established in not a few cases. On the other hand, it is said that technology for production of these materials, which are promising as new materials for food, is delayed in food-industry circles.



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New Developments from Japan

Composite Filtration Membrane Pioneered

Ise Chemical Industries Co., together with Professor E. Kikuchi of Waseda University, has developed a composite filter membrane by coating multiporous glass with palladium alloy.

The company has succeeded in producing super high-purity hydrogen gas (purity: over 99.999%) using the composite membrane. It aims at applying the product to a hydrogen removing reactor used in petrochemical and industrial-gas production processes.

Since five years ago the company has tackled exploitation of demand areas for multiporous glass and developed and marketed last year fillers and columns both for high-speed liquid-chromatography equipment. In a related development, it has pioneered the composite filter membrane.

Palladium naturally has hydrogen permeation properties and has hitherto been used for hydrogen separation in the form of an alloy membrane. Application of the membrane is, however limited since it lacks mechanical strength and is expensive and it is difficult to produce thin membranes from it.

High-quality Metal Tapes Destined for U.S., Europe.

Dainippon Ink and Chemicals, Inc (DIC) has pioneered high-quality metal tapes for digital audio tape (DAT) recorders and 8-mm VTRs. The company plans to start marketing the new products in April, with shipment destinations centered on the States and Europe for the time being.

It has completed a manufacturing plant (capacity: 2 million rolls in terms of 120-minute DATS) at its Saitama factory.

It aims at staging an export drive in the States by establishing a sales company there. The combined sales target for the new products three years hence has been set at ¥5,000 million a year.

Bioventure, Major Reagent Maker Link For Electrophoretic Units

Biomate Co. — a bioventure engaged in reagents and related equipment — will tie up with Wako Pure Chemical Industries Ltd., a major reagent maker — for sales of reagents and devices related to the electrophoretic process.

As a start, it will soon market Wako "Agafix" hydrophilic polyester film for electrophoresis and the "Ace 21" electrocooling electrophoresis instrument. It hopes to obtain a share of more than half of the domestic market for these products in two to three years. These products are receiving good response from users and the two companies are looking forward to bullish sales in Japan.

Biomate is well known for its business activities in immunological reagents and instruments, while Wako has been striving to expand its lineup of electrophoretic reagents and devices in a bid to become the top maker in this field.

Unique Lactic-acid Bacterium For Dairy Use Developed

The Calpis Food Industry Co., together with a Japanese dairy-farmers' association, has developed by means of biotechnology

an efficient lactic-acid bacterium for dairy use and has begun commercializing the product. It is used for producing silage, green fodder preserved in a silo.

To obtain good milk, dairy farmers need silage and production of good silage requires efficient lactic-acid bacteria. The new bacterium has been developed to satisfy this requirement of dairy farmers, the company says.

In addition to domestic sales, it intends to export the bacterium to the U.S., European countries and Australia where dairy farming is being extensively carried out.

Blue-green Algae Marketed as Food

Nippon Oil Co. has started marketing its "stylina" health-care product — granules produced from spirulina (blue-green algae). The company plans to sell 20,000 units of the product each containing 800 granules, in the initial year. A unit is priced at ¥4,800.

The company has established unique technology for mass-producing spirulina and is growing the plant on an idle site belonging to its Okinawa refinery.

The plant grows naturally in alkaline lakes in Mexico and Africa and is eaten by local people. It is rich in protein and has a well-balanced content of amino acids, vitamins, minerals and chlorophyll.

Shoden Pioneers Aluminum Granules As Fine-Ceramic Material

Showa Denko K. K. (Shoden) has developed fine aluminium granules (average diameter: 100 microns) to be used as fine-ceramic material; they are suitable for dry-type pressing. The com-

pany has supplied them to more than 20 companies for technical evaluation.

They have excellent fluidity and moldability and can easily be sintered since they contain specific binders. Their sintering density reaches 98% at 1,550°C. They are available in three types 3-N(purity: 99.9%) 4-N(99.99%) and 5-N(99.999%).

The company has built a 10-t/m pilot plant in a bid to develop them into one of the big-seller products of its alumina operations.

The granules are produced by transforming ultrafine alumina particles (average diameter: 0.5 microns) into slurry, adding specific binders — which consist of several types of organic chemicals — thereto and spray-drying the resulting product. Special technical know-how is required in the combining of the slurry and organic binders and for setting the conditions for spray-drying.

The aluminium granules have these features (1) their diameter is large and particle-size distribution is "sharp" (2) they have such good mould-release characteristics that they ensure high moulding density; (3) their bending strength at normal temperature stands at 50-60 kg/mm², nearly equivalent to that of alumina powder; (4) they facilitate production of void-free ceramics; and (5) the yield ratio of ceramics produced from them is high due to their low shrinkage during sintering.

Oxynitride Glass Transformed Into Ceramic Fiber

Shimadzu Corp. together with two university researchers, has developed technology for trans-

forming oxynitride glass into fibre using spinning machines.

The fiber's physical properties are: tensile strength, 500-600 kg/mm² and modulus in tension, 20-25,000 kg/mm². These values are higher than those of ordinary pitch-based carbon fiber 300-400 kg/mm² and 13,20,000 kg/mm² respectively. It is gray and its cross section is circular. Its diameter ranges from 7 to 20 microns.

The company has installed a 60-t/y pilot plant at its Sanjo factory and started sample deliveries of the new fiber, which is dubbed "ceramic fiber". It is less expensive than carbon fiber.

The company expects the new product to be used as reinforcing fiber for fiber-reinforced plastic and ceramics and take the place of carbon fiber. In addition, it envisages finding new outlets for the product in cores for optical fiber and covering for elastic wires.

Oxynitride glass is composed mainly of nitrogen, oxygen and silicon and also contains such metals as magnesium, aluminium and lanthanum. It is produced by melting glass powder containing all these components within a crucible. The company has pioneered a new process to introduce nitrogen in high concentration into the raw materials. The glass has a large modulus of elasticity and is resistant against acids and alkalis.

p-Tertiary Butoxystyrene Mass-Produced: Hokko Chem.

Hokko Chemical Industry Co. has established technology for

mass producing p-tertiary butoxystyrene (PTBST) — functional macromolecular monomer — using the Grignard reaction process.

Sample deliveries of the product will be inaugurated immediately. A multipurpose plant based on the process will be employed for this purpose: it was completed at the company's Okayama factory last year.

The company has already commercialized phosphine products using the Grignard reaction process. It expects PTBST to be used in wide areas and become a major item in its fine chemicals line.

CFC-Recycling System Developed: Showa Denko

Showa Denko K.K. has developed a recycling system for flon 113 gas (chlorofluorocarbon, CFC) and a refining system for flon 113 liquid. The two systems will be marketed from April.

The former incorporates a new absorption process, which is free from the defects of the conventional active carbon-applied adsorption process. It has attained a recycling rate of 95% and the purity of recycled products is higher than 99.9%.

Reduction of production and consumption of flon 113 has already been agreed on at international conventions since the product is suspected of destroying the ozone layer. A satisfactory substitute for the product has yet to be found and there is strong demand for developing a recycling system.

MARKET INFORMATION

Mercury Shoots Up

The price of Mercury shot up to Rs. 9,800/- per flask in the Bombay Chemicals and dyes market during this week. Ready goods were in acute shortage. It was reported that huge stock of mercury is held up at the customs and hence the shortage.

Caustic soda and soda ash ruled steady at Rs. 200 and Rs. 440/- per 50 kg. Methanol and formaldehyde though better than last week, continued to be tight. Solvents had easy turnover.

The dyes section was dull. The

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local enquirers were not encouraging. Dye intermediates were quoted at high prices.

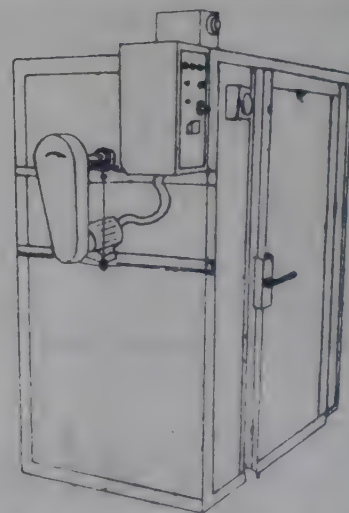
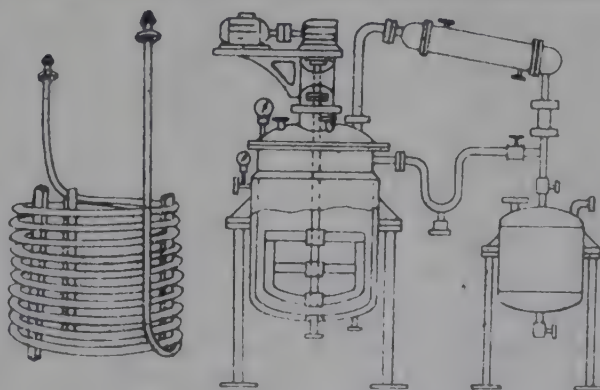
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Ammonium nitrate	3.50
Arsenic white powder	21.00
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Barium carbonate	6.00
Bleaching powder (33% Cl)	3.80

Borax (Granular)	15.00
Borax (Powder)	15.50
Boric acid (Tech.)	21.00
Bisphenol-A	45.75+ST
Butyl carbitol	35.00
Caustic soda (Flakes)	8.00
Caustic soda (Solid)	7.60
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 36% (Anhydrous)	5.00

Calcium Carbonate PPT	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	82.00
Cresylic acid	50.00
Cream of Tartar (Tech.)	64.00
Citric acid (Belgium) (Resale)	44.00
Citric acid (Indian) (Resale)	43.00
Copper sulphate	17.50
Chromic acid	50.00
Cyanuric chloride	120.00
Cobalt oxide	280.00
Carbitol	50.50+ST

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Ethylene urea	56.00	Sodium sulphide 50-52%		Butanol (Resale)	34.50
Glue flakes	8.45	(Flakes)	8.00	Benzyl chloride	24.00
Glue sheets	6.75	Sodium sulphide 58-60%		Benzo trichloride	16.00
Gohsenol GH-17	90+ST	(Flakes)	9.00	Benzoyl chloride	22.00
Hydro (Resale)	38.00	Sodium sulphide pure (Flakes)	12.25	Bromine Liquid	42.50
Hyflosupercell	18+ST	Sodium nitrite (Resale)	16.00	Chloroform	24.50
Hexamine (Resale)	40.00	Sodium chlorite 80% (Spain)	92.00	Carbon Tetrachloride	13.00
Industrial Wax	25.00	Sodium chloride 50% (Spain)	81.00	Cellosolve	44+ST
Litharge	15.00	Santobrite (Indian)	36.00	Cyclohexanone	47+ST
Lead Acetate (Tech.)	28.50	Soda Ash (Tata)	4.00	Cyclohexanol	43.00
Lithopone	15+ST	Soda Ash (Biria)	3.80	Diacetone (Resale)	35.00
Magnesium chloride (crystal)	1.80	Soda Ash (Imp.)	3.50	Diethyl Oxalate	34.00
Menthol crystal (Flakes) 185+Ex.+ST		Sodium bicarbonate	5.25	Diethylene glycol (DEG)	36.00
Menthol bold	205+Ex.+ST	Sodium bisulphite	4.50	Diethyl Phthalate	52.00
Menthol crystal cold	245+Ex.+ST	Sodium silicate	3.00	Diallyl Phthalate	56.00
Magnesium carbonate (Japan)	16.00	Sodium acetate	6.00	Dimethyl Phthalate	28.00
Magnesium carbonate (Indian)	15.00	Sodium alginate	108+ST	Diethyl Adipate	52.00
Maleic Anhydride (per kg)		Titanium Dioxide (Anatase)	50+ST	Dibutyl Adipate	42.00
(Resale)	45.00	Titanium Dioxide (Rutile — RCR ₂)	69+ST	Dipentene	15.00
Mercury (75 lbs.)	9,000.00	Tartaric acid (Crystal)	94.00	Dimethylamine 40%	12.00
Nickel chloride	90.00	Trisodium phosphate	4.80	Dimethylamine 60%	14.00
Oxalic acid (Resale)	20.00	Thiourea	68+ST	Ethyl Acetate	20.50
Peppermint oil (Rectified) 90+Ex.+ST		Urea (Tech)	2.75	Ethyl Acrylate	46.00
Potassium carbonate (indian)	19.00	Vacuum salt	1.00	Ethylene Dichloride	11.00
Potassium carbonate (Imported)	21.00	Zinc Dust	30.00	Ethylene Glycol	23.25
Potassium bichromate	22.00	Zinc Oxide	30.00	Formic Acid (Imp) (Resale)	26.50
Potassium phosphate (Mono)	14.00	Zinc chloride powder		Formaldehyde (Resale)	7.75
Potassium phosphate (Di)	14.00	(technical)	14.00	Glycerine (CP)	50.00
Polyvinyl alcohol (No. 117)	88.00	Zinc sulphate	4.00	Glycerine (IW)	49.00
Polyvinyl alcohol (No. 173)				Hydrogen peroxide 50%	
(Resale)	94.00	SOLVENTS	Per kg.	(Resale)	29.00
Polyvinyl alcohol (No. 208) 78.50+ST		Acetic Acid (Glacial) (Resale)	13.35	Isopropyl Alcohol	17.50
Paraformaldehyde (Resale)	21.00	Acetic Anhydride (Resale)	30.00	Iso Butyl Alcohol	28.00
Phthalic anhydride 36%		Acetone (Resale)	15.00	(Resale)	30.00
(Resale)	24.00	Adipic Acid	51+ST	Monoethanolamine (Resale)	45.00
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Paraffin wax (Resale)	14.50	Aniline Oil (Resale)	42.00	Methyl Ethyl Ketone	41.00
Rangolite (German)	70.00	Benzoate Plasticiser	33.00	Methyl Isobutyl Ketone	36.00
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Sapna Sangeeta Main Road,
Indore-452 001.

Phone : 61603 Cable : BETA

Telex : 735 349 BNPL IN

WORKS :

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Nitric Acid (Con.) (RCF)	2.50
Ortho Cresol	31+ST
Phenol (Resale)	30.50
Propylene Glycol	34.00
Polyethylene Glycol (No. 200)	37.00
Polyethylene Glycol (No. 400)	43+ST
Polyethylene Glycol (No. 500)	42.00
Polyethylene Glycol (No. 1600)	14.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (6000)	50.00
Para Cresol	40.00
Styrene monomer	41+ST
Sorbitol	18.50
Sulphuric Acid	2.10
Trichloroethylene	27.00
Triethanolamine (Resale)	42.00
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Triethylamine	50.00
Vinyl Acetate Monomer	41.30

SOLVENTS	Per Litre
Benzene	10.25
N-Heptane	8.00
N-Hexane	8.75
Methanol	8.25
Solvent Naphtha Heavy	9.50
Solvent Naphtha Light	8.50
Toluene	9.90
Xylene	14.50

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)

Alphanaphthylamine	60.00
Alpha Naphthol (Imp.)	165.00
Aceto Acetic Ester (Methyl)	63.00
Ammonium Molybdate	180.00
Anthraquinone	70.00
Anthranilic Acid	60.00
2-Amino-4-Nitrophenol (Imp.)	125.00
Blue B. Base (Local)	130.00
Beta Naphthol (Atul)	60.00
Benzidine Dihydrochloride (BDH)	80.00
Bromamine Acid	375.00
BON Acid	105.00
Chicago Acid	280.00
Coach Acid	56.00
C. Acid (Imp.)	260.00
Cyanuric Chloride (Japan)	118.00
2, 4, DNCB	26.00
Dihydrothio PTOS (Imp.)	600.00
Dimethyl Aniline	60.00
Diethyl Aniline	140.00
Di-amino stilbene disulphonic acid	120.00
3, 3-DCB (Imp.)	180.00
Gamma Acid (Atul)	170.00
H. Acid (Atul)	155.00
G. Salt	57.00
Isophthalic Acid	40.00
J. Acid	260.00
J. Acid Urea	275.00
K. Acid	95.00
MDPS (German)	200.00
MNA	80.00

Meta Unido Aniline	140.00
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MPD (Japan)	180.00
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N-Methyl J. Acid	380.00
N-Methyl Aniline	120.00
Naphthalene (Refined)	22.00
Naphthalene (Refined)	24.00
Ortho Anisidine (OA Imp)	83.00
Ortho Dichloro Benzene (ODCB)	10.50
OT Base	12.00
Para Dichloro Benzene (PDCB)	16.00
Para Anisidine (PA-Imp.)	110.00
Para Anisidine (PA-Local)	87.00
PNA	86.00
Para Cresidine (Imp.)	325.00
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PNCB	28.00
Para Amino Acetanilide	145.00
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Para Amino Benzoic Acid	170.00
PT Base	88.00
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Resist Salt	20.00
Resorcinol	140.00
Sodium Naphthionate	64.00
5-Sulpho-Anthranilic Acid	60.00
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Sulpho Tobias Acid	100.00
Trichloro Benzene (TCB)	15.00
Tobias Acid	114.00

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187, Sherif Devji Street, 1st Floor,
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Phones : 333854/333864

Bombay Dyes Market

(Prices as on 10th May, 1988)

ACID COLOUR	Per Kg				
Acid Violet 4BS	143.00	Red	96.90	Red D2B Powder	477.40
Acid Maroon V	110.00	Dark Tan	78.25	Violet C 4R	521.90
Acid Orange II	77.80	Red IIR	72.55	Blue BG Powder	235.45
Acid Orange IIV	63.05	Red 4B	169.10	Blue BN Powder	103.75
Acid Red A	107.25	Bordeaux BW	132.30	Blue D 2R Powder	476.25
Crosein Scarlet MOG	155.00	Fast Scarlet 4BS	166.55	Navy BT Powder	243.90
Acid Scarlet 3R	99.90	Red 12B	170.55	Blue B 2G Powder	210.20
Acid Red 38N	135.00	Bordeaux Hly Conc.	194.00	Black BT Powder	182.60
Acid Red R2R	132.00	Cotton Red N	117.05	Blue BR Powder	390.20
Acid Red RS	88.00	Brill. Fast Helio B	278.00	Yellow 7GL	338.60
Acid Green V	230.00	Brill. Fast Helio 2B	297.00	Yellow 5RX	218.80
Acid Patent Blue AS	250.00	Brill. Fast Helio 2RS	136.20	Yellow 3G	367.25
Acid Coomasi Blue	200.00	Brill. Fast Helio BS	116.10	Yellow	140.00
Acid Yellow 5GN	65.00	Brill. Violet Extra	126.40	Yellow AL	135.30
Acid Red PG	85.00	Blue 2B	86.40	Yellow Brown REL	247.50
Acid Red GRS	78.00	Blue G	170.50	Yellow FFL	463.60
Acid Black 10 BX	121.95	Sky Blue FB	188.25	Gold Yellow GG	259.70
Acid Black BX	98.40	Copper Blue GR	147.00	Pink REL	247.00
Acid Black Wax	135.50	Fast Greenish Blue GL	114.60	Red REL	468.65
Procinil Yellow GS (ICI, UK)	265.00	Developed Black BT	116.10	Red 2B	327.40
Procinil Red GS (ICI, UK)	630.00	Blue NB-2B	300.20	Red FB	324.20
Procinil Blue RS (ICI, UK)	315.00	Blue NB-2BC	185.30	Red Violet FBL	469.85
Procinil Scarlet G (ICI, UK)	600.00	Developed Black NB-GHB	185.30	Orange 3R	196.65
Procinil Orange G (ICI, UK)	250.00	Green B	111.65	Violet 3R	280.00
Procinil Rubine (ICI, UK)	650.00	Green NB-B	188.25	Violet RL	275.45
		Green 2B-N	188.25	Violet 6R	485.75
		Brown MR	154.40	Scarlet RR	214.85
		Brown CN	107.25	Rubine 3B	223.05
		Golden Brown G	140.35	Rubine CB	364.90
		Catechin G	120.50	Blue GL	318.95
		Omega Tan	126.40	Blue BGF	636.55
		Catechin GS	102.80	Navy Blue RF	270.40
		Black E Hly Conc.	142.60	Brown 3REL	200.40
		Black E Extra Hly Conc.	142.60	Black GEL	324.20
		Black NB-ER Hly. Conc.	310.50	Dark Brown 3B	317.40
DIRECT COLOURS	Per Kg	DISPERSOL COLOURS	Per Kg	BASE COLOURS	Per Kg
Yellow 3GX	88.10	Yellow 6G Powder	143.80	Fast Yellow	80.20
Gun Yellow RCH	124.00	Red B 3B Powder	247.80	Fast Orange GC	135.45
Fast Yellow GCH	141.15	Red B 2B Powder	323.20	Fast Scarlet R	166.90
Yellow CFG Hly. Conc.	312.00	Red CB Powder	439.15	Fast Scarlet RC	126.65
Fast Yellow GS	111.65				
Fast Yellow CHRS	95.45				
Viscose Orange	166.15				
Fast Orange GR	133.75				

Fast Scarlet RCR	99.05	Navy Blue H 3R	298.50	Blue RR Supra Powder	629.35
Fast Scarlet G	121.65	Brill. Blue H-GR	366.55	Blue Conc. Powder	645.80
Fast Scarlet GN	91.50	Brill. Blue H 5G	173.10	Brill. Blue 2R Hly. Conc.	378.55
Fast Scarlet GG	72.70	Blue H 5R	283.85	Brill. Blue 2R Supra Disp.	115.65
Fast Scarlet GGS	72.75	Brill. Blue H 7G	178.70	Dark Blue 2R Powder Fine	389.25
Fast Red B	203.20	Brill. Blue H 7RX	358.15	Blue BC Supra Disp.	359.40
Fast Red RC	119.15	Turquoise HA	234.45	Jade Green XBN Powder Fine	438.20
Fast Red R Flakes	149.25	Supra Blue H-3RP	335.70	Jade Green XBN Acra	
Fast Red TR	166.80	Supra Turquoise H 2GP	181.50	Conc. Powder	623.90
Fast Red TR Oil	183.15	Blue H 5RX	269.30	Jade Green 2G Pdr. Fine	419.65
Fast Red RL	237.10	Navy Blue H ER	258.60	Jade Green 2G Ptg. Paste	125.40
Fast Red KB Oil	201.90	Blue H-ERD	305.80	Jade Green XBN Ptg. Paste	126.00
Fast Bordeaux GP	201.95	Navy Blue M 3R	310.95	Jade Green 2G Supra Disp.	496.00
Fast Garnet GBC	94.05	Brill. Blue MR	331.70	Olive Green B Pdr. Fine	399.90
Fast Violet B	505.60	Brill. Blue M RX	214.20	Olive D Pdr. Fine	444.30
Fast Blue BB	521.45	Brill. Blue M-G	382.30	Olive Green B Supra Disp.	308.25
		Blue M 4GD	344.60	Jade Green XBN Supra	
NAPHTHOL COLOURS	Per Kg	Navy Blue M RB	318.75	Disp. (N)	327.30
ASG	217.00	Turquoise M-G	197.85	Olive OMW Pdr. Fine	698.55
AS	143.00	Brill. Blue M GX	302.50	Olive OMW Supra Disp.	538.05
ASSW	279.75	Blue 3R Acra Powder	718.20	Olive R. Pdr. Fine	422.95
ABBS	189.15	Dark Brown H 6R	248.45	Olive R. Pdr. Fine	422.95
ASBO	195.65	Cobalt Oxide (per kg)	285.00	Olive D Supra Disp.	361.70
ASD	175.50	Green H 4BD	269.80	Olive R supra Disp.	363.90
ASOL	179.35	Green H-E4B	169.80	Olive D. Ptg. Paste	193.00
ASTR	279.75	Red Brown H IF	143.25	Olive Green B. Ptg. Paste	199.10
ASPH	279.75	Orange Brown H 28	209.05	Olive Green B Acra Conc.	542.75
ASE	196.05	Brown M GRN	188.60	Olive R Acra Conc.	640.00
ASEI	184.40	Black H-N	283.35	Olive Green B Acra Conc.	542.75
ASLB	1632.60			Brown R Pdr. Fine	835.00
ASBT	1817.00	SULFUR COLOURS	Per Kg	Brown G. Pdr. Fine	795.00
ASWG	143.00	Navy Blue	99.85	Brown R Pdr. Fine	659.75
ASSG	397.70	Green G	105.55	Dark Brown 3R Pdr. Fine	685.00
ASSR	480.50	Black Grains Extra	63.05	Brown G. Supra Disp.	449.90
		Black Grains OG	64.55	Brown 2G Supra Disp.	554.00
PROCION COLOURS	Per Kg	Black GXE Conc.	61.60	Brown R Supra Disp.	422.95
Golden Yellow HR	181.80	Black GXE	52.75	Brown BR Powder	719.00
Brill. Yellow H4G	117.85	Black GXR	61.60	Dark Brown 3R Ptg. Paste	217.15
Supra Yellow H-8GP	168.55	Black Grains 800	54.20	Dark Brown 3R Supra Disp.	414.55
Brill. Yellow HE6G	166.95	Black EXR Grains	64.55	Brown G Acra Conc.	733.95
Yellow H-E4R	276.05	Black EXR Grains 800	51.25	Brown R Acra Conc.	766.00
Brill. Yellow H7G	332.30	VAT COLOURS (ICI)	Per Kg	Grey M. Powder Fine	768.80
Yellow M4R	243.95	Yellow 5G Powder Fine	673.15	Grey M. Supra Disp.	585.45
Yellow M GR	326.05	Yellow 5G Supra Disperse	439.30	Blue BC Acra Conc. Pdr. Fine	762.70
Brill. Yellow M4G	177.10	Yellow 5G Acra Conc.	628.75	Direct Black AC Supra Disp.	330.35
Brill. Yellow M8G	332.30	Yellow 3R Powder	588.85	Direct Black AC Pdr. Fine	474.70
Yellow M 3R	217.60	Gold Orange 3G Pdr. Fine	952.15	Direct Black CH Supra Disp.	393.20
Brill. Orange H 2R	241.85	Brill. Orange 6R Pdr. Fine	624.35	Direct ACD Ptg. Paste	217.15
Brill. Red H 7B	157.95	Gold Orange 3G Supra Disp.	601.30		
Brill. Orange M 2R	313.15	Brill. Orange 6RX Powder	394.30		
Brill. Red H 85	169.45	Brill. Red 3B Pdr. Fine	997.80		
Brill. Scarlet H RN	245.05	Brill. Red 3B Supra Disp.	713.20		
Supra Red H-3BP	179.30	Brill. Purple 4R Conc. Pdr.	470.75		
Brill. Red H-F3B	243.45	Brill. Purple 3R Acra Powder	690.85		
Brill. Magenta H8	167.00	Brill. Purple 2R Hly Conc.	597.90		
Brill. Red M. 5B	98.90	Brill. Purple 4R Supra Disp.	500.05		
Brill. Red M 8B	173.70	Brill. Purple 2R Acra Conc.	625.95		
Brill. Pink MB	137.10	Blue R Powder Fine	542.15		
Brill. Magenta MB	121.55	Blue BC Conc. Pdr. Fine	522.50		
Brill. Purple H-3R	180.20	Blue BC Acra Conc. Pdr. Fine	762.70		
Brill. Purple H-7R	175.40	Blue R Conc. Pdr. Fine	577.65		

Madras Market

Market conditions showed an upward trend during the week under review. Borax granular marked up by Rs. 30 to be quoted at Rs. 670. Cresylic Acid registered a slight increase

to be traded at Rs. 87, while Meta Cresol 40/42% finished at Rs. 47.

Caustic soda items were traded lower, at 8,200 per ton. A few items in the solvents sections showed marginal differences in the price conditions.

(MADRAS MARKET RATES AS ON MAY 7, 1988)

Acetic Acid — Glacial (per kg)	18.00	Hydrosulphite of Soda TCPL (per kg)	33.00
Acid Slurry (Soft) (per kg)	28.00	Hydrosulphite of Soda IDI (per kg)	36.50
Aluminium Sulphate Iron free (per tonne)	1,700.00	Hydrosulphite of Soda BASF (per kg.)	38.00
Ammonium Bi-carbonate (per 25 kg.)	125.00	Hydrogen Peroxide (India) (per kg.)	35.00
Ammonium Chloride SPIC (per tonne)	1800.00	Hyflo Supercell	19.50
Bleaching Powder — Mettur (per 25 Kgs. bags)	100.00	Magnesium Carbonate Light	18.00
Borax Granular	670.00	Potassium Bichromate (per kg)	26.00
Cresylic Acid 100% (per kg)	87.00	Phosphoric Acid (per kg)	18.00
Meta Cresol 40/42% (per kg)	47.00	Phthalic Anhydride (per kg)	27.00
Para Cresol 80/85% (per ton)	52.00	Pentaerythritol (per kg)	62.00
Caustic Soda Flakes (Mettur) (per ton)	8,200.00	Paraffin Wax (per kg)	13.50
Caustic Soda Flakes (Andhra Sugar)	8,200.00	Oxalic Acid (per kg.)	20.00
Citric Acid — Indian (per kg)	43.00	Soda Ash (TAC) (per 75 kg)	325.00
Copper Sulphate (per 50 kg.)	1000.00	Soda Ash (TATA) (per 75 kg)	325.00
Formic Acid (India) (per kg)	28.00	Sodium Cyanide Indian (per kg.)	47.00
Formaldehyde (per kg)	8.00	Sodium Cyanide Degussa (per kg)	70.00
Glycerine (per kg)	42.00	Sodium Bichromate (per kg)	18.50
		Sodium Bicarbonate (per 50 kg)	285.00

Sodium Nitrite (per 50 kg)	660.00
Sodium Nitrate (per 50 kg)	430.00
Sodium Silicate (per tonne)	4000.00
Sodium Sulphate (per tonne)	3500.00
Sodium Sulphide Flakes (per tonne)	13,000.00
Sodium Bi-sulphate (per 50 kg.)	185.00
Stearic Acid (per kg)	32.00
Trisodium phosphate (per 50 kg)	340.00
Titanium Di-oxide Indian TTP (per kg)	53.00
Titanium Di-oxide Indian Rutile (per kg)	63.00
Urea Tech (per tonne)	2800.00
Zinc Oxide (per kg.)	34.00
Zinc Chloride Powder (per kg.)	13.00
Zinc Sulphate (per tonne)	4,500.00
Di-octyl phthalate (per kg.)	47.00
Di-butyl phthalate (per kg.)	47.00
Hexamine (per kg)	28.00

SOLVENTS

Acetone (H.O.C.) (per kg)	17.00
Isopropyl Alcohol NOCIL (per kg.)	21.50
Diacetone Alcohol NOCIL (per kg.)	28.50
Benzene SAIL (per kg)	15.00
Diethylene Glycol NOCIL (per kg)	33.00
Butanol NOCIL (per kg)	33.50
Toluene SAIL (per litre)	14.00
Xylene IPCL (per litre)	17.00
Phenol HOC (per kg.)	28.00
Turpentine (per litre)	16.50
Sorbitol (per kg.)	30.00
Trichloroethylene MCIC (per kg)	23.50
Carbon Tetra Chloride (per kg)	16.00
Chloroform (per kg)	25.50
Methylene chloride (per kg)	24.00
Methyl Ethyl Ketone (per kg.)	42.00
Cellosolve (per kg)	52.00
Triethanolamine (per kg)	23.50
Ethyl Acetate (per kg.)	22.00
Butyl Acetate (per kg)	40.00
Methanol (per litre)	8.00

Delhi Market

DELHI: MAY 5 (NNS) — Mercury prices flared up sharp by Rs. 300 per flask on higher advices from Bombay. Zinc oxide also jumped up sharply by Rs. 2000/3000 per tonne due to the increased in the prices of zinc metal by MMTC. Citric acid lost Rs. 150 in the absence of offtake. Menthol lost Rs. 16 on stockists offerings. The local market faced acute shortage of funds as the some of the reputed traders failed to make payment on time during the past two days.

Following the rise in prices of mercury by Rs. 500 per flask in Bombay and reports to tight stock position there, prices of the chemicals in the local market rose by Rs. 300 at Rs. 9,800. Traders were in a hope of further rise in prices as and when the local demand will revive. Zinc oxide recorded a spurt of Rs. 2000/3000 at Rs. 35,000/40,000 per tonne in the local market as the MMTC has raised zinc metal prices by Rs. 2.50 at Rs. 38 per kg. from first of May. Hexamine

gained Rs. 2 at Rs. 42 on tight supply position. Titanium dioxide Anatase and RC. 822 rose by 50 paise to Re. 1 at Rs. 50 and Rs. 64 per kg due to power cut in Kerala. Following arrivals of 20/25 tonnes of chemical and tight money conditions, hydrogen peroxide lost Rs. 2 at Rs. 30 per kg. Formic acid remained quiet at Rs. 28. Citric acid thin slumped by Rs. 150 at Rs. 2,100 per 50 kg. on pressure of arrivals from Bombay Dyeing.

Menthol flake, medium and bold suffered a loss of Rs. 16 at Rs. 162, Rs. 172 and Rs. 182 per kg. respectively on hopes of early commencement of new crop production in U.P. Mentha oil eased by Rs. 5 at Rs. 125 per kg. Hopes of good crop of menthol grass in U.P. in the coming season also dampened the sentiment. Sodium nitrite Deepak lost Rs. 25 at Rs. 875 on stockists offerings. Paraffin was also eased by Rs. 10 at Rs. 600 per 50 kg. Sufolight and Chatkolight were also traded lower.

Dyes and colours remained quiet.

(DELHI MARKET RATES AS ON MAY 6, 1988)

Ammonia Bicarb (per 25 kg)	118.00
Mercury (per flask)	9800.00
Soda ash (per bag)	270-295.00
Ammonium chloride (per 50 kg)	115-180.00
Caustic soda solid	No Stock
Caustic soda flakes (per 50 kg.)	400-405.00
Citric acid (per 50 kg)	2100-2400.00
Stable Bleaching Powder Shriram (per 25 kg)	95.00
Stable Bleaching Powder KCI (per 25 kg)	85.00
Stable Bleaching Powder MODI (per 25 kg.)	90.00
Sod. Bicarbonate (per 50 kg)	255-270.00
Sod. Hydro Sulphite (per kg)	34.50-36.50
Rangolite (per kg)	49-70.00

Boric acid Technical (per 50 kg)	980.00
Paraffin wax (per 50 kg)	600.00
Tartaric acid (per 50 kg)	6,850.00
Borax Granular (per 50 kg)	570.00
Borax Crystal (per 50 kg)	575.00
Sodium Nitrate (per 50 kg)	400-425.00
Sodium Nitrite (per 50 kg)	850-875.00
Camphor Powder (per kg)	86.00
Camphor Thal (per kg)	97.00
Menthol Medium (per kg)	172.00
Menthol Flakes (per kg)	162.00
Menthol Bold (per kg)	182.00
Glycerine (per kg)	42-43.00
Sodium Silicate (per quintal)	200-250.00
Hexamine (per kg)	42.00
Acetic Acid Glacial (per kg)	13-13.50
Copper Sulphate (per quintal)	1800-2100.00

Formic acid (per kg)	28.00
Formaldehyde (per kg)	8.00
Hydrogen Peroxide (per kg)	30.00
Calcium Carbonate (per tonne)	2500-4000.00
Acid Slurry Soft (per kg)	22.00
Acid Slurry Hard (per kg)	30.00
Phosphoric Acid (per 50 kg)	825.00
Pot. Nitrate (per quintal)	900-1200.00
Pot. Permanganate (per 50 kg)	2300.00
Sod. Bichromate (per 50 kg)	1025-1125.00
Tri-Sod. Phosphate (per 50 kg)	340-350.00
Titanium Dioxide Anatase (per kg)	50.00
Titanium RC-822 (per kg)	64.00
Zinc Oxide (per mt)	3500-4000.00
Phenol Carbollic Acid (per kg)	33.00
Carbon Tetrachloride (per kg)	17.50
Chloroform (per kg)	26.00
Sodium Sulphate (per 50 kg)	160.00
Naphthalene Balls (per 50 kg)	1400.00

DYES & COLOURS per kg

Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES (per kg)

Black E. Conc.	92-155.00
Diazo Black B.T.	125.00
Green B.	119.00
Blue 2-B	86.00
Sky Blue FB	200.15
Basic Auramine O' Conc.	55-100.00
Basic Rohdamine B. 500%	220-320.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Materials Exported

BOMBAY

(From 6.1.88 to 18.1.88)

(Cost of Exported Item is
CIF Value)

ALPHA NAPHTHYL AMINE:
To Kobe: Sahyog Chemicals, Ahmedabad, 5,000 kgs., Rs. 2,55,584.75.

ALUMINIUM CHLORIDE: To Felixstowe: Mangalam Inorganics Ltd., Bombay, 19,800 kgs., Rs. 2,03,603.09.

ALUMINIUM SULPHATE: To Colombo: The Dharamsi Morarji Chemicals, 60 mt., Rs. 75,309.
ALUMINIUM SULPHATE POWDER: To Dubai: Jabal Exports, 10,000 kgs., Rs. 24,000.

ANION EXCHANGE RESIN:
To Thunder Bay: Henkel Chemicals (I) Ltd., 10,895 kgs., Rs. 5,42,510.

ANTHRA BIS THIAZOLE-6:
To Bangkok: Indian Dyestuff Industries Ltd., 1,500 kgs., Rs. 2,05,392.

DAPSONE TECHNICAL: To Rotterdam: Metro Exports P. Ltd., 1,000 kgs., Rs. 1,09,737.

DICHLORO ANTHRAQUINONE: To New York: Indian Dyestuff Industries Ltd., 1,500 kgs., Rs. 1,82,910.

DICHLORO ANILINE: To Leeds/Manchester: Alchemie Dychem P. Ltd., Bombay, 500 kgs., Rs. 21,000.

DIHYDROXY QUINOLINE: To Germany: Jaysynth Dychem P. Ltd., 480 kgs., Rs. 1,66,417.

DYE INTERMEDIATES: To Kobe: Jay Chemical Industries, Ahmedabad, 1,300 kgs., Rs. 1,10,500; 20,000 kgs., Rs. 11,26,000; To Antwerp: Sandoz India Ltd., 11,925 kgs., Rs. 7,74,402; To Piraeus: Indian Dyestuff Industries Ltd., 1,400 kgs., Rs. 6,23,000; To New York: Bhoir

Import Export P. Ltd., 3,880 kgs., Rs. 3,38,286.08; To Odessa: Zenith Ltd. (Chemical Division), 17,500 kgs., Rs. 15,83,680; 17,500 kgs., Rs. 15,88,959.66; Chemical Distributors (India), 10,000 kgs., Rs. 13,76,288.66; 15,384.62 kgs., Rs. 13,76,288.60; Zenith Ltd., Bombay-20, 19,500 kgs., Rs. 12,83,642.80; To Hamburg: Zenith Ltd., Bombay-20, 12,950 kgs., Rs. 14,46,720; To New York: Atul Products Ltd., 8,000 kgs., Rs. 7,19,618; To Genoa: J. K. Promotions 3,450 kgs., Rs. 1,86,304; To Yokchama: Gujarat State Export Corporation Ltd., 1,250 kgs., Rs. 1,17,000; To Hong Kong: Indian Dyestuff Industries Ltd., 15,000 kgs., Rs. 6,86,000; To Kaohsiung: Priya Electronics, 4,200 kgs., Rs. 3,71,007; To Busan: Hickson & Dadajee Ltd., 5,240 kgs., Rs. 5,35,725; To Kaohsiung: Hickson & Dadajee Ltd., 1,040 kgs., Rs. 1,08,053; To Busan: Priya Electronics & Chemicals, 1,250 kgs., Rs. 1,90,394; Brinda Exports Agencies, 1,076 kgs., Rs. 1,25,000; To Bangkok: Indian Dyestuff Industries Ltd., 7,000 kgs., Rs. 16,73,709; To Busan: Magatul Chemicals P. Ltd., 3,000 kgs., Rs. 1,74,300; To New York: Vibgyor Dye-Chem, 2,500 kgs., Rs. 2,64,000.

FATTY ACIDS: To Hamburg: Enlita Chemical Industries P. Ltd., 19,830 mt., Rs. 4,00,947.

FAST RED TR BASE: To Antwerp: Kantilal Sanghvi & Co., 2,000 kgs., Rs. 2,58,000.

FERRIC CHLORIDE ANHYDROUS: To Gdansk: Mahindra UGINE Steel Co. Ltd., 54,000 kgs., Rs. 2,90,112.

GAMMA ACID: To New York: Priya Chemical, 2,500 kgs., Rs. 1,06,005.

GUAR GUM: Indian Gum Industries Limited, 18,000 kgs., Rs. 4,29,124; To New York: K. Uttamlal (Exports) P. Ltd., Bombay, 20 mt., Rs. 4,23,410; Sanjay Corpn., Bombay-23, 800 kgs., Rs. 4,53,350.85.

GUAR GUM POWDER: To Hamburg: Sanjay Gums and Chemicals, Bombay-23, 20 kgs., Rs. 4,91,458; 20 kgs., Rs. 2,65,978; Sanjay Corpn., Bombay-23, 20,000 kgs., Rs. 4,53,350.85; To New York: Shree Mahalaxmi Co., 18,144 kgs., Rs. 3,57,635.

GUAR GUM REFINED SPLITS:
To Houston: New Krishna Gum Industries, 72,000 kgs., Rs. 16,32,063; Rajendra Chemicals, 72,000 kgs., Rs. 16,55,716; Sarada Gums and Chemicals, 72,000 kgs., Rs. 16,32,063; Adarsh Guar Gum Udyog, 72,000 kgs., Rs. 16,32,063; To Houston: Jai Bharat Gum & Chemicals, 1,44,000 kgs., Rs. 30,27,595; To Osaka: Premchem Gums Pvt. Ltd., 18,000 kgs., Rs. 4,12,371.

H. ACID: To Odessa: Indodyes Chemical Industries, 14,100 kgs., Rs. 11,00,000; To New York: Bhoir Import Export Pvt. Ltd., 6,410 kgs., Rs. 5,72,602; To New York: Gujarat State Export Corporation Ltd., 2,005.50 kgs., Rs. 2,23,000; To Buenos Aires: Gokul Enterprises, Bombay-49; 12,801.3 kgs., Rs. 12,61,488; To New York: Bhoir Import Export P. Ltd., 2,730 kgs., Rs. 2,28,672.53; To Odessa: Sajjan Impex P. Ltd., Bombay, 14,700 kgs., Rs. 12,64,312.50; To Le Harve: Atul Products Ltd., 6,033 kgs., Rs. 8,47,444; To Hamburg: Sadhana Nitro Chem Ltd., 13,166 kgs., Rs. 12,30,517.

GUAR GUM: To Aarhus: Indian Gum Industries Ltd., Bombay-21, 1,600 kgs., Rs. 9,32,990; To Bergamo: Indian Gum

Industries Ltd., 60,000 kgs., Rs. 14,22,680; To Hamburg: Indian Gum Industries Ltd., Nariman Point, Bombay-21, 1,600 kgs., Rs. 8,80,904; To Houston: Jai Bharat Gum & Chemicals, 72,000 kgs., Rs. 1,15,200.

GUM ROSIN: To Bahrain: Jivaji Rasulji Bhindrawala, 800 kgs., Rs. 11,500.

DINITRO DIPHENYL SULPHONE: To Osaka: Sadhana Nitro Chem Ltd., 3,000 kgs., Rs. 1,75,371.

CHROME PIGMENTS: To Piraeus: Sudarshan Chemical Industries, 500 kgs., Rs. 24,735.80.

ORGANIC PIGMENTS: To Toronto: Sudarshan Chemical Industries, 13,000 kgs., Rs. 8,63,418.29; 7,000 kgs., Rs. 4,64,917.54; To Piraeus: Sudarshan Chemical Industries, 400 kgs., Rs. 38,787.60.

RODENTICIDE: To Bangkok: United Phosphorus Ltd., 5,000 kgs., Rs. 1,46,336.

INORGANIC PIGMENTS & SYNTHETIC RESINS: To Bahrain: Mantul Enterprises, 280 kgs., Rs. 2,694.

INORGANIC PIGMENTS & SYNTHETIC RESINS & ADHESIVES: To Bahrain: Mandul Enterprises, 720 kgs., Rs. 6,439.

INSOLUBLE SULPHUR: To Liverpool: Metazinc (India) P. Ltd., Bombay, 10 kgs., Rs. 1,79,813.

iodo CHLOROXY QUINOLINE: To Rotterdam: Chemistar, 100 kgs., Rs. 22,520.

TURQUOISE BLUE G: To Hong Kong: Hayendrakumar Hiralal Kharawala, 2500 kgs., Rs. 2,03,000.

LIQUID PARAFFIN: To Dubai: Al Hafiz Traders, 200 kgs., Rs. 10,000.

GUAR GUM POWDER: To New York: Sanjay Corporation, Bombay, 18 kgs., Rs. 3,78,449.

META CHLORO ANILINE: To

Whampoa: Kalyani Steels Ltd., 16,200 kgs., Rs. 10,18,801.

METHYLENE CHLORIDE: To Odessa: Gujarat Alkalies and Chemicals Ltd., 36 mt., Rs. 1,87,200; 54 mt., Rs. 2,80,800; 54 mt., Rs. 2,80,800.

NAPHTHA: To Aden: Indian Oil Corporation Ltd., 38,500 kgs., Rs. 6,28,79,961.

NAPHTHOL ASBS: To New York: Standard Dychem, Surat, 1,000 kgs., Rs. 1,18,265.44.

NITROBENZENE: To New York: Hindustan Organic Chemicals Ltd., 16,000 kgs., Rs. 3,20,143.

ORGANIC PIGMENTS: To Manchester: Sudarshan Chemical Industries, 11,500 kgs., Rs. 6,11,963.55.

ORTHO NITRO CHLORO BENZENE: To Shanghai: Hindustan Organic Chemicals Ltd., 2,88,000 kgs., Rs. 39,38,809.

OXALIC ACID: To Rotterdam: Excel Industries Ltd., Bombay, 40,000 kgs., Rs. 3,25,887.

Dyes Materials Exported

BOMBAY
(From 6.1.88 to 18.1.88)
(Cost of Exported Item is
CIF Value)

ARLINDONE BROWN IRRD (N): To Odessa: Arlabs Ltd., Bombay-1, 500 kgs., Rs. 1,96,500.

ARLINDONE GOLDEN YELLOW IRK: To Odessa: Arlabs Ltd., Bombay-1, 500 kgs., Rs. 1,92,500.

BRILL. ORANGE: To Busan: Amritlal Chemaux Ltd., 500 kgs., Rs. 53,634.

COALTAR DYES: To Odessa: Indian Dyestuff Industries Ltd., 9,000 kgs., Rs. 14,22,000; To

PARA BASE ESTER: To Rotterdam: Colour Chem Ltd., 9,600 kgs., Rs. 10,68,039.

PHORATE 45% MIN. GRADE: To Leghorn: Pesticides India, Udaipur, 15,000 kgs., Rs. 1,10,000.

PHORATE TECH. 85 (MINIMUM): To Genoa: Pesticides India, Udaipur, 6,075 kgs., Rs. 4,90,000.

PHTHALOCYANINE BLUE 2661: To Piraeus: Sudarshan Chemical Industries, 200 kgs., Rs. 27,639.07.

RICINOLEIC ACID: To Auckland: Jayant Oil Mills, Bombay-10, 16 mt., Rs. 3,76,082.47.

SODIUM CYANIDE: To Darwin: Cyanides and Chemicals Co., 36,000 kgs., Rs. 4,49,409; To Freemantle: Cyanides & Chemicals Co., Bombay, 36,000 kgs., Rs. 4,36,082; 36,000 kgs., Rs. 4,44,678.

TOLUIDINE RED 405: To Piraeus: Sudarshan Chemical Industries, 500 kgs., Rs. 56,671.70.

VINYL SULPHONE: To Antwerp: Sherda International, 10,696 kgs., Rs. 7,82,809.

Piraeus: Indian Dyestuff Industries Ltd., 600 kgs., Rs. 2,12,449; 500 kgs., Rs. 1,51,088; 2,000 kgs., Rs. 1,95,679; To Bangkok: Indian Dyestuff Industries Ltd., 7,288 kgs., Rs. 7,74,286.

DIRECT BLACK E: To Genoa: Indian Dyestuff & Chemical Industries, 2,000 kgs., Rs. 1,49,409.

DIRECT BLUE 2B: To Mumbai: Mahendra Industries, 450 kgs., Rs. 26,381.

DYESTUFFS: To Apapa, Lagos: Amritlal Chemaux Ltd., Bombay-1, 250 kgs., Rs. 40,736

HINDASOL ORANGE GR: To Odessa: Arlabs Ltd., Bombay-1, 1,000 kgs., Rs. 27,000.

HINDASOL SCARLET RH/C: To Odessa: Arlabs Ltd., Bombay-1, 1,000 kgs., Rs. 41,900; 1,500 kgs., Rs. 62,250.

ACID RED 73: To Rotterdam: Jamshri Ranjitsinghji Spinning & Weaving, 2,500 kgs., Rs. 2,32,316.

MONAZOL BLACK B: To Antwerp: Monarch Dyestuff Industries, 5,000 kgs., Rs. 3,79,812.

SYNTHETIC COALTAR DYES: To Hamburg: Bhoir Import Export P. Ltd., Bombay, 2,500 kgs., Rs. 2,52,168.19; To Rotterdam: Bhoir Import Export P. Ltd., 2,000 kgs., Rs. 1,46,730.55; To Dubai: Panky Export Corporation, 120 kgs., Rs. 5,720.

MAGENTA POWDER: To Kobe: Kabbur Industries P. Ltd., 2,000 kgs., Rs. 2,29,632.

METANIL YELLOW: To Toronto: Atlantic Exports, Bombay, 500 kgs., Rs. 10,315.37; To Ho-deidah: Esufali Akbarali & Co., Bombay-3, 8,000 kgs., Rs. 41,787.12; 1,600 kgs., Rs. 39,579.51; 4,000 kgs., Rs. 1,08,518.04; 2,400 kgs., Rs. 59,252.58.

MONAZOL BLACK BI REACTIVE: To Antwerp: Monarch Dyestuff Industries, 5,000 kgs., Rs. 3,74,042.

NAVINON BLUE BC CDP: To New York: Indian Dyestuff Industries, 1,000 kgs., Rs. 3,05,403.

NAVINON BRILLIANT BLUE: To Mombasa: Indian Dyestuff Industries Ltd., 875 kgs., Rs. 1,69,273; 125 kgs., Rs. 23,540.

ORGANIC DYES: To Bangkok: Goodlass Nerolac Paints Ltd., 1,500 kgs., Rs. 76,000.

ORGANIC DYESTUFF: To New York: Uni Impex India, 1,245 kgs., Rs. 4,10,861.

ORGANIC PIGMENTS: To Bangkok: Indian Dyestuff Industries Ltd., 900 kgs., Rs. 1,15,265.

REACTOFIX RED: To Sydney: Jaysynth Dyechem Ltd., 9,150 kgs., Rs. 12,65,440.

SYNTHETIC ALKYD ENAMEL WHITE: To Odessa: Chemicals De Universe P. Ltd., 33,600 kgs., Rs. 7,12,320; 16,800 kgs., Rs. 3,56,160; 13,600 kgs., Rs. 2,88,320.

SYNTHETIC COALTAR DYES: To Piraeus: Indian Dyestuff Industries Ltd., 600 kgs., Rs. 2,11,848; To Kobe: Sandoz (India) Ltd., 1,050 kgs., Rs. 1,95,245.83; To Antwerp: Sandoz (India) Ltd., 2,880 kgs., Rs. 4,48,556; To New York: Jaysynth Dyechem P. Ltd., 1,500 kgs., Rs. 2,62,812; To Jakarta: Golden Dyes Corporation P. Ltd., 1,830 kgs., Rs. 87,300; To Dubai: Shabro Exports P. Ltd., 4,300 kgs., Rs. 3,53,154; Castlon Colour Chem Industries, 1,000 kgs., Rs. 17,000; 3,000 kgs., Rs. 52,000; To Mombasa: Mahendra Industries, 1,150 kgs., Rs. 72,778.20; To Priof: Golden Dyes Corporation India P. Ltd., 775 kgs., Rs. 49,700; To Hong Kong: Little & Co., 200 kgs., Rs. 59,790; To Rotterdam: Chemiequip P. Ltd., Bombay-21, 475 kgs., Rs. 68,378; To Jakarta: Chemiequip P. Ltd., 1,000 kgs., Rs. 1,47,700; To Singapore: Indian Dyestuff & Chemical Manufacturers, 2,600 kgs., Rs. 2,04,993; To Penang: Indian Dyestuff & Chemicals Mfg., 4,000 kgs., Rs. 1,78,712; To Odessa: Garuda Chemicals, 800 kgs., Rs. 2,20,000; To New York: Chemiequip P. Ltd., 2,000 kgs., Rs. 1,62,943; Bhoir Import Export P. Ltd., 2,000 kgs., Rs. 4,52,956; To Hong Kong: Bhoir Import Export P. Ltd., 7,000 kgs., Rs. 6,58,934; To Rotterdam: Sai-

ba Agencies, 2,000 kgs., Rs. 1,53,636; To New York: K. Patel Chemo Pharma P. Ltd., 1,000 kgs., Rs. 1,44,000; To Jakarta: K. Patel Chemo Pharma P. Ltd., 2,000 kgs., Rs. 60,000; To Manila: Sipka Sales Corpn., 2,000 kgs., Rs. 1,29,796.

SYNTHETIC COLOURS; DYE FOOD COLOURS: To Dubai: Mohamed Hussain Lari & Co., 900 kgs., Rs. 25,200.

SYNTHETIC ORGANIC DYES: To Odessa: Arlabs Ltd., Bombay, 1,875 kgs., Rs. 3,43,875; 625 kgs., Rs. 2,45,625; 1,000 kgs., Rs. 3,92,000; 2,870 kgs., Rs. 6,17,050; 475 kgs., Rs. 2,13,750; 500 kgs., Rs. 2,25,000; 1,100 kgs., Rs. 29,700; 2,000 kgs., Rs. 83,000; 1,000 kgs., Rs. 41,500.

SYNTHETIC ORGANIC DYE-STUFF: To Rotterdam: Vipul Dyes and Chemicals P. Ltd., 10,000 kgs., Rs. 7,81,407.34; To Hamburg: Vipul Dyes & Chemicals P. Ltd., 2,000 kgs., Rs. 2,98,327.15; To Piraeus: Chika Ltd., Bombay-4, 1,000 kgs., Rs. 47,631.14; 800 kgs., Rs. 40,429.70; To Antwerp: Vipul Dyes & Chemicals P. Ltd., 1,000 kgs., Rs. 1,14,265.44.

SYNTHETIC ORGANIC DYE-STUFFS: To Antwerp: Vipul Dyes and Chemicals P. Ltd., 2,000 kgs., Rs. 1,03,960; 52,000 kgs., Rs. 2,77,969.89; 2,000 kgs., Rs. 2,77,969.89; To Odessa: Usha Intercontinental, New Delhi, 6,000 kgs., Rs. 10,20,000; To New York: Indokem Ltd., 4,000 kgs., Rs. 5,35,808; To Jakarta: Atlas Dye Chem Industries, 9,000 kgs., Rs. 6,91,677; To New York: Priya Electronics & Chemicals Ltd., 4,000 kgs., Rs. 4,90,342; Sahyadri Dyestuff & Chemicals, 3,000 kgs., Rs. 4,68,000; To Barcelona: Sahyadri Dyestuffs & Chemicals, 1,050 kgs., Rs. 1,78,000.

Drugs Materials Exported

BOMBAY

(From 6.1.88 to 18.1.88)

(Cost of Exported Item is
CIF VALUE)

BENZYL BENZOATE IP/BP:

To Colombo: Ganesh Medicament P. Ltd., 500 kgs., Rs. 16,000.

CALCIUM MINERAL TABLETS:

To Lagos: Meyer Organics P. Ltd., Thane, 1,872.8 kgs., Rs. 1,03,995.

CRUDE DRUGS: To New York: Jairamdas Khushiram, Bombay-3, 10,708 kgs., Rs. 81,000.

DEXAMETHASONE TABLETS:

To Colombo: Bombay Drug House P. Ltd., 77 kgs., Rs. 17,200.

DIAZEPAM TABLETS B.P.:

To Lagos: Health Care Pharmaceuticals, 2,050 kgs., Rs. 76,600.

DRUGS & DRUG INTERMEDIATES: To Toronto: Metro Exports P. Ltd., 4,000 kgs., Rs. 7,96,767.14.

ERYTHROMYCIN ESCOLATE:

To Hamburg: Lawande Pharmaceuticals P. Ltd., 1,000 kgs., Rs. 8,80,991.

IBUPROFEN: To Gdansk: Dipak Laboratories P. Ltd.,

5,679 kgs., Rs. 13,03,450.

IBUPROFEN B.P.: To Busan:

Priya Electronics & Chemicals, 500 kgs., Rs. 1,19,050; 300 kgs., Rs. 71,430; To Gdansk: Dipak Laboratories P. Ltd., 2,000 kgs., Rs. 4,78,500.

BERBERINE HYDROCHLORIDE IP IX:

To Kobe: Himalayan Products Industries Corporation, 1,200 kgs., Rs. 4,47,516.

INSECTICIDES: To Bangkok:

Excel Industries Ltd., 346 kgs., Rs. 44,678.

IODINE TINCTURE B.P. 50

MI: To Dubai: Monji Vishram &

Co., Bombay, 300 kgs., Rs. 11,277.

PARACETAMOL TABLETS:

To Lagos: Ampray Laboratories, 700 kgs., Rs. 6,31,958.76.

POTASSIUM IODIDE POWDER B.80:

To Hong Kong: Santosh Pharmaceuticals, 5,000 kgs., B.P.: To Odessa: M. J. Exports, Rs. 10,31,209.

Chemicals Materials Imported

BOMBAY

(From 14.1.88 to 19.1.88)

(Cost of Imported Item is
CIF Value)

CYANURIC CHLORIDE:

Gujarat Chemical Industries, 500 kgs., Rs. 21,662; Bhavani Dyechem Industries, 1,000 kgs., Rs. 43,325.

DI HYDROXY QUINOLINE:

From Germany: Jaysynth Dyechem Ltd., 480 kgs., Rs. 1,66,117.

DYE INTERMEDIATE: From

UK: Atic Industries Ltd., 1,080 kgs., Rs. 58,696.

DYESTUFF: From Germany:

Larsen & Toubro Ltd., 25 kgs., Rs. 11,956.

HYDRAZINE HYDRATE 80%:

From Japan: Dyes Distributors India Ltd., 32,000 kgs., Rs. 7,47,834.

HYDROXY QUINOLINE CARBOXY ACID:

From Germany: Jaysynth Dyechem P. Ltd., 480 kgs., Rs. 1,61,073.

META TOLUENE DIAMINE

80/20: From Germany: Shreenath Dyestuff, 2,400 kgs., Rs. 76,265.

SULPHOL BRILLIANT BLUE:

From UK: S.F. Chem Industries Ltd., 200 kgs., Rs. 14,203.

SULPHOL BRILL. GREEN: From

UK: S.F. Chem Industries Ltd.,

PREDNISOLONE TABLETS

B.P.: To Odessa: M. J. Exports, P. Ltd., Bombay, 1,90,476 kgs., Rs. 14,66,665.20.

SALBUTAMOL TABLETS BP

(2 Mg): To Colombo: FDC P. Ltd., 147 kgs., Rs. 28,690.

TINIDAZOLE: To Gdansk: Dipak Laboratories P. Ltd.,

750 kgs., Rs. 1,74,000.

100 kgs., Rs. 9,638.

SULPHOL INDIGO BLUE B.

CONC.: From UK: S.F. Chem Industries Ltd., 2,900 kgs., Rs. 2,52,177.

TITANIUM DIOXIDE RUTILE:

From France: U.K. Paint Industries, 20 mt., Rs. 5,97,230.

TITANIUM DIOXIDE: From

Japan: Asian Paints India Ltd., 50,000 kgs., Rs. 12,98,325; From UK: Seaking Marine Services, 4,000 kgs., Rs. 1,11,857; From USA: Asian Paints India Ltd., 13,608 kgs., Rs. 3,44,818.

TITANIUM DIOXIDE 97% MIN:

From China: Inter Asian Chemical Ltd., 4,500 kgs., Rs. 70,002; Inter Asian Chemical Ltd., 4,500 kgs., Rs. 70,002; Inter Asian Chemical Ltd., 4,500 kgs., Rs. 70,000; 4,475 kgs., Rs. 69,613.

TITANIUM DIOXIDE RUTILE

GRADE: From USA: Coates of India Ltd., 17,000 kgs., Rs. 4,35,912.54; Asian Paints India Ltd., 15,000 kgs., Rs. 3,87,245; From Italy: IEL Ltd., 16,000 kgs., Rs. 4,58,049; From Italy: IEL Ltd., 16,000 kgs., Rs. 4,58,049.

TRIMETHYL INDOLINE: From

Japan: Diamond Dyes and Chemicals, 400 kgs., Rs. 94,650.

DISPERSE DYESTUFF: From

Korea: Jalan Woollen Industries, 2,750 kgs., Rs. 1,10,656.

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- Mono-Ammonium Phosphate
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- Mono-Sodium Phosphate - Anhydrous
- Sodium Acid Pyro Phosphate
- Di-Sodium Phosphate - Crystals
- Di-Sodium Phosphate - Anhydrous
- Tetra Sodium Pyro Phosphate
- Tri Sodium Phosphate - Anhydrous
- Mono Calcium Phosphate
- Di-Calcium Phosphate - $2H_2O$ /Anhydrous
- Tri-Calcium Phosphate
- Mono Potassium Phosphate
- Di-Potassium Phosphate
- Tetra Potassium Pyro - Phosphate
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- Sodium Acetate - Anhydrous
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Perchloroethylene	Para Tertiary Butyl Phenol	Organic Surface Active Agent

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CHOLINE CHLORIDE
CUPROUS IODIDE
CADMIUM IODIDE
CALCIUM CITRATE
CALCIUM CHLORIDE
CALCIUM STEARATE
COBALT CARBONATE
D.A.P.

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FURFURAL ALCOHOL
FERROUS SULPHATE
GUM ROSIN
HYPO
LEAD STEARATE
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MANGANESE SULPHATE
MAGNESIUM CHLORIDE
MAGNESIUM SULPHATE
MOLYBDIC ACID
NICKEL SULPHATE
NICKEL CARBONATE
POTASSIUM BROMIDE

POTASSIUM NITRITE
POTASSIUM IODIDE
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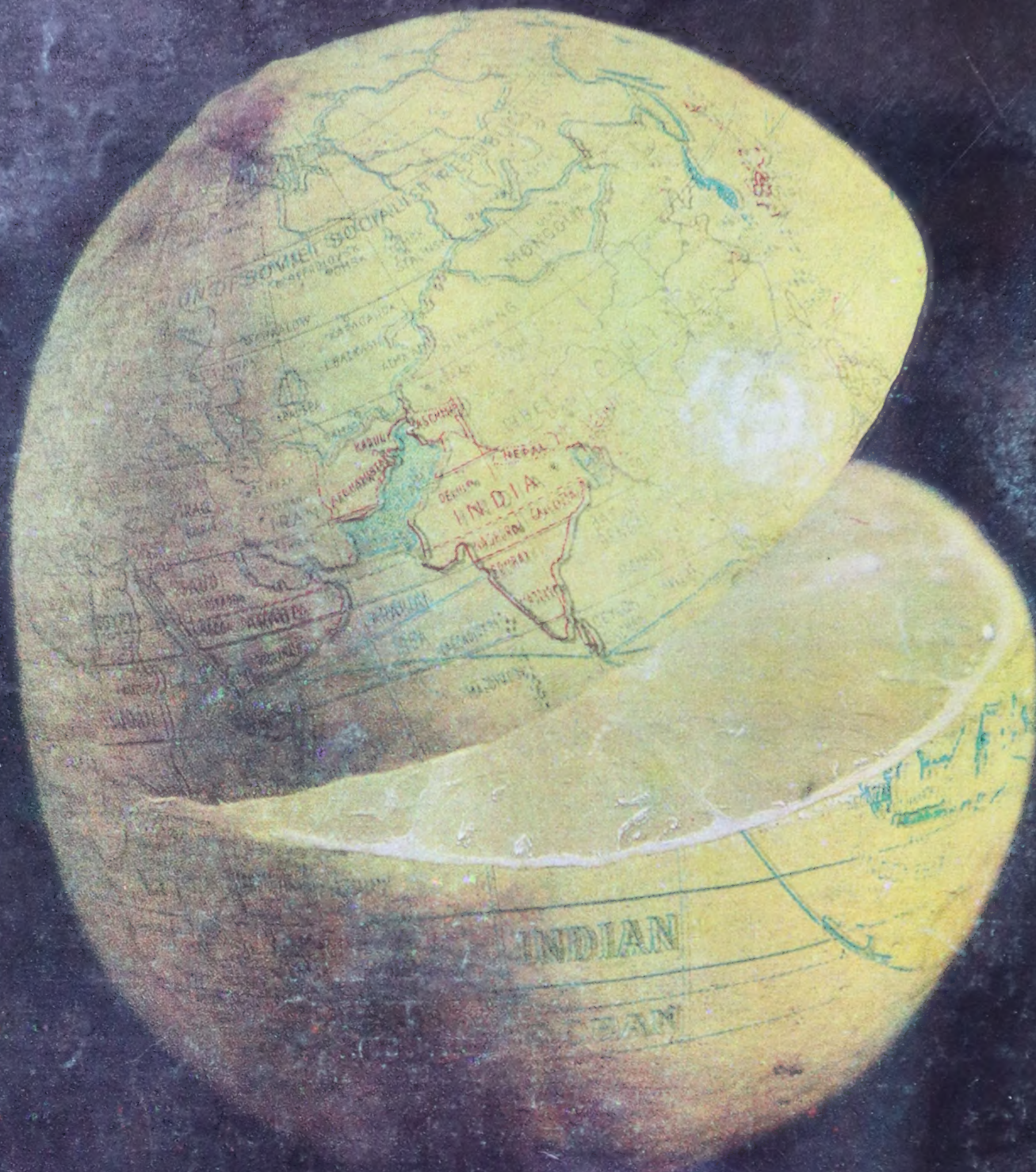
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